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GEOPHYSICAL ABSTRACTS 116

JANUARY-MARCH 1944

COMPILED BY

W. AYVAZOGLOU AND V. SKITSKY

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GEOPHYSICAL ABSTRACTS 116
JANUARY - MARCH 1944 1/

Compiled by W. Ayvazoglou 2/ and V. Skitsky 2/

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FOREWORD

Geophysical Abstracts 1 - 86 were issued in mimeographed form by the Bureau of Mines; Abstracts 87 - 111 were published in bulletins of the Geological Survey; Abstracts 112 - 115 were issued in mimeographed form by the Bureau of Mines as Information Circulars 7256, 7257, 7267, and 7273.

ADDENDUM: In Geophysical Abstracts 115, p. 6, no. 7144, lines 2-3, the expression "observed and adopted values H, Z, D" refers to base-line values. The publication, however, includes also tables of hourly mean values H, Z, D and of diurnal variation.

1/ The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is used: "Reprinted from Bureau of Mines Information Circular 7285."

2/ Physical science analytical editor, Bureau of Mines, U. S. Department of the Interior.

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1. GRAVITATIONAL METHODS

7253. Arkhangelsky, A. D. Geological Results of the General Magneto metric and Gravimetric Surveys of the U.S.S.R. (in Russian). Internat. Geol. Cong., Rep. of the 17th Sess., Moscow-Leningrad 1937, vol. 1, Moscow, 1939, pp. 241-250.

Geophysical methods have been used in the U.S.S.R. to study geo gical problems. Such is the case of the general magnetometric and gr metric surveys made jointly by the Main Physical Observatory, Main Office of Geodesy and Cartography, Institute of Terrestrial Magnetism and Main Office of Geophysical Prospecting. Some institutions supplie the data, others processed them. Geological interpretation was made the author. (1) Regional magnetic anomalies in the plains of the U.S.S are traceable to the folded substratum overlain by sedimentary rocks these anomalies promise to yield data characterizing the substratum respect to strike and depth. Anomalies in European U.S.S.R. suggest that the pre-Cambrian substratum of the East European plateau consi of elements of different ages. In the most ancient of them, the main strike of the folding is almost latitudinal; in the younger ones, the fol is oriented in the meridian. (2) The Faye and Bouguer gravity anoma are caused primarily by differences in the density of rocks composin upper crust and by unknown processes producing changes of density a depth; these processes are not connected with isostatic movements. anomalies in the European and adjoining Asiatic U.S.S.R. promise to dicate the volume of the pre-Cambrian massif of the east-European teau and to clarify the interrelations between the Ural, Tian-Shan, ar Donetz Basin folding systems, as well as between the Dnieper-Donet depression and the mid-European depression. - V. S.

7254. Clark, S. K. Classification of Faults. Bull. Am. Assoc. Petr Geologists, Tulsa, Okla., vol. 27, No. 9, 1943, pp. 1245-1265.

A proposed classification of faults is based upon the type of m anical failure involved. The types recognized are (1) normal diagon shears, (2) reverse diagonal shears, (3) horizontal faults, (4) tensio faults, (5) lateral shears, and (6) vertical shears. The types are dia grammed and, with the exception of vertical shears, are described o the basis of actual occurrences. - Author's abs.

7255. Dryden, H. L. Absolute Gravity-Determinations. National R Council, American Geophysical Union, Transactions of 1943, Washington, D. C., 1943, pp. 42-43.

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The U. S. National Research Council Committee on Fundamental ysical Constants recently appointed a Subcommittee on Gravity to study e various determinations of the absolute value of gravity and to recom- nd a "best" value. This Subcommittee found only three determinations serving consideration: (1) F. Kühnen and Ph. Furtwängler, Geodetic stitute, Potsdam; (2) P. R. Heyl and G. S. Cook, National Bureau of ndards, Washington; and (3) J. S. Clark, National Physical Laboratory, ddington. These determinations were reduced to values referred to the tional Bureau of Standards 1936 gravity-station at Washington, D. C., by ans of corrections for local relative gravity-values. As a result, com- rable absolute gravity-values were obtained and are cited. The final commendation of the Subcommittee is 980.083 ^{0}gals as the "best" lue for absolute gravity at the N.B.S. 1936 station, Washington, D. C. - V. S.

056. Eby, J. B. Geophysical History of the Iowa Field, Calcasieu and Jefferson Davis Parishes, Louisiana. Geophysics, Menasha, Wis., vol. 8, No. 4, 1943, pp. 348-355.

The discovery well of the Iowa field was drilled in October 1931, nd the field has produced 48,000,000 barrels of oil to date. The history f the early refraction seismograph, gravity, and reflection seismograph xploration of this important field is presented. - Author's abs.

057. Garner, C. L. Scientific Economic Value of Basic Gravity Data. Proc., Eighth Am. Sci. Cong., 1940, Washington, D. C., vol. 7, Physical and Chemical Sciences, 1942, pp. 63-65.

Gravity data are at present used in both scientific research and ctical exploration. As a result, the demand for them is increasing. ccordingly, the U. S. Coast and Geodetic Survey has recently undertaken provide basic data for all general purposes. The geophysicists need ese data as controls of local surveys; most gravimeters are built on e principle of the spring and require frequent standardization at base ations. Many gravimeters are extremely accurate, giving values to 10 milligal. A vast amount of such information in the United States aits processing. Efforts have also been made to extend observations yond continental United States. The Navy has carried out, jointly with her organizations, three gravity-at-sea expeditions in the general re- n of the West Indies and the Caribbean Basin. The Coast and Geodetic rvey has cooperated with other organizations in making observations Cuba and in the Bahamas. - V. S.

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7258. Gorshkov, P. M. Gravity Knowledge of the Eastern Part of the U.S.S.R. (abs.). Internat. Geol. Cong., 17th sess., U.S.S.R., 1937; Abstracts of Papers, Moscow, 1937, p. 186.

Insufficient gravity surveying has been done so far in the eastern part of the U.S.S.R., which includes western and eastern Siberia, the no eastern part of Kazakh SSR, and the Far East. Gravity stations here st form regional systems. The results of observations show that gravity anomalies, such as Faye, Bouguer, and isostatic, are present everywhe The absolute values of anomalies do not differ markedly for plains and mountains. In some hilly localities isostatic anomalies are more infor ative geologically than other anomalies, such as Faye. The general con clusion for eastern U.S.S.R. is that most of the area is isostatically balanced. - V. S.

7259. Gunn, Ross. A Quantitative Study of the Lithosphere and Gravity Anomalies Along the Atlantic Coast. Jour., Franklin Inst., Lancaster, Pa., vol. 237, No. 2, 1944, pp. 139-154.

The principle of isobaric equilibrium is quantitatively applied to strong lithosphere near a continental boundary. Following methods out lined in earlier papers, the deformation of the lithosphere near Cape Henry is determined from the magnitude and distribution of the sedime tary and fluid load superimposed upon the original crystalline basemen From the calculated figure and the equivalent load, the resulting distri tion of vertical stress and gravity defect are estimated. Except for th prediction of appreciable positive gravity defects at the continental she the calculated and observed gravity distributions are quite similar. Th fibre stress due to the deformation is evaluated, and it is shown that th position of the calculated maximum stress in tension on the landward side coincides with the observed position of lithospheric failure or the Fall Line. The strength in tension of the upper lithosphere here is sho to be less than (8.5×10^8) dynes/cm.^{2} The simultaneous prediction of approximate magnitudes of the gravity anomalies, their distribution, a the location of the Fall Line appears to show that a strong elastic litho sphere characterized by the constant $b = 8.4 \pm 2 \times 10^{-8}$cm.$^{-1}$ has a re and important geological existence. The investigation shows that, owi to the finite strength of the lithosphere, long linear areas parallel to continental coast lines are usually regions of disturbed gravity. - Author's abs.

7260. Hess, H. H. Peridotite Intrusions, Gravity Anomalies, and Isla Arcs: A Contribution to the Ophiolite Problem (abs.). Internat. Geol. Cong., 17th sess., U.S.S.R., 1937, Abstracts of Papers, Moscow, 1937, pp. 182-183.

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In the East and West Indies the peridotite intrusions are situated parallel to strong negative gravity anomalies. These intrusions can be also found in other strongly deformed mountain systems. Apparently, they always occurred when the mountains were in an island-arc stage of development. Other environments do not seem to bring about such intrusions. As an explanation, V. Meinesz' downbuckling theory of gravity anomalies and structural experiments of Kuenen are cited. It is further postulated that the peridotite magma is a water-rich product of partial fusion of the peridotite substratum. It migrates up the vertical structures of the down-buckle immediately after this buckle has been shoved into the peridotite substratum. Soon thereafter the bottom of the buckle becomes sealed, and no further eruptions take place. - V. S.

7261. Klaus, H. Faulting in the Billings Oilfield, Oklahoma, as Interpreted from Torsion-Balance Data and From Subsequent Drilling. Geophysics, Menasha, Wis., vol. 8, No. 4, 1943, pp. 362-378.

An abstract of this paper appeared in Geophysics, vol. 8, No. 3, 1943, p. 325 (see Geophy. Abs. 114, No. 7010). - V. S.

7262. Lagrula, Jean. L'Emploi de la gravimetrie dans l'etude de la structure géologique de l'Algérie. (Abstract, The Use of Gravimetric Method in the Study of the Geological Structure of Algeria). Internat. Geol. Cong., 17th sess., U.S.S.R., 1937, Abstracts of Papers, Moscow, 1937, p. 189.

Gravimetric surveying in Algeria was done with the Holweck-Lejay apparatus. This instrument measures the time, T, related to local gravity, "g", by the formula: $g = g_a - \frac{k}{T^2}$. Herein g_a and k are constants for two reference stations determining gravity in absolute figures. The gravity computed from this formula must be corrected for the Faye, Bouguer, and topographical corrections, giving the corrected "g_o". Gravity anomalies are then calculated as the differences $(g_o - \gamma_o)$, where γ_o is the theoretical value of gravity; this value is determined on the basis of the progressive increase of the earth's density from the surface to the center. The results of the Algerian survey were interpreted in terms of the isostatic theory. According to this theory, islands and shore belts are isostatically positive, and inland regions isostatically negative. Findings, partly supplied by the present investigation, confirm this distribution, if the Sahara desert is regarded as a sea and the Sahara plateau as a continent. They give for Tougourt, + 41; Guerrara, - 26; Ghardaïa, - 4; Colomb-Béchar, - 33; Taghit, - 17; and Béni-Abbés, - 26. - V. S.

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7263. Lockenvitz, A. E. The Periodic Variations of the Gravitational Force (abs.). Geophysics, Menasha, Wis., vol. 8, No. 3, 1943, pp. 325-326.

A commercial LaCoste-Romberg gravity meter has been operating as a self-recording meter since last August. The recorded curves have been compared with those obtained from calculations on a rigid earth theory. The nature of the differences and some possible interpretations will be discussed.

7264. McCollum, E. V., and Brown, Andrew. Use of the Gravity Meter in Establishment of Gravity Bench Marks. Geophysics, Menasha, Wis., vol. 8, No. 4, 1943, pp. 379-390.

Data are presented showing comparisons between various gravity meters and networks of gravity-meter bench marks. Methods of adjustment of networks for closure are suggested. Ties to pendulum stations of the U. S. Coast and Geodetic Survey and the Dominion Observatory of Canada afford a basis for the calibration of the gravity meters used and the evaluation of the gravity-meter bench marks in terms of the world gravity network. Probable errors and accuracies are discussed. - Author's abs.

7265. Nettleton, L. L., and Elkins, T. A. Association of Magnetic and Density Contrasts with Igneous Rock Classifications. Geophysics Menasha, Wis., vol. 9, No. 1, 1944, pp. 60-78.

An abstract of this paper appeared in Geophysics, vol. 8, No. 3, 1943, p. 328 (see Geophys. Abs. 115, No. 7147). - V. S.

7266. Zamorev, A. A. A Study of the Two-dimensional Reversed Prob of the Theory of the Potential (in Russian). Bull. Acad. Sci. U.R.S (Izvestiia), Sér. Geog. Geophys., Moscow, No. 4/5, 1941, pp. 487-

The two-dimensional reversed problem of the theory of the poten is generally formulated as follows: There are given on a line situated outside a disturbing body the values of a derivative of the potential; it i necessary to determine by means of these values the data characterizi the shape, location, and density of the disturbing body. The present pa deals with the following aspects of this problem: (1) The unidecimal d termination of values characterizing the disturbing body according to t external gravitational potential; (2) the analytical prolongation of the derivative of the potential; (3) the analytical prolongation of the

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erivatives of the potential in the particular case of one disturbing body imited by analytical curves; and (4) the determination of the shape of a wo-dimensional disturbing body. These questions are treated in terms f integral calculus. - V. S.

2. MAGNETIC METHODS

Arkhangelsky, A. D. Geological Results of the General Magnetometric and Gravimetric Surveys of the U.S.S.R. (in Russian). Internat. Geol. Congress., Rept. 17th sess., Moscow-Leningrad, 1937, vol. 1, Moscow, 1939, pp. 241-250 (see Geophys. Abs. 7253).

7287. Bronstein, K. G. Some Ideas on the Relationship Between Geomagnetic and Geological Data (abs.). Internat. Geol. Cong., 17th sess., U.S.S.R., 1937, Abstracts of Papers, Moscow, 1937, p. 185.

The relationship between magnetic and geological data cannot be explained by the induction hypothesis and does not depend on any one single factor. Exploration has shown that magnetic fields are distorted not only by accumulations of ferromagnetic minerals, but also by pre-Cambrian ferro siliceous rocks. Moreover, direct calculations of magnetization intensity for rocks of the Kursk Magnetic Anomaly give values several times those produced by induction. Finally, the relationship between centers of secular magnetic variations and geological factors does not agree with the induction hypothesis. An explanation must be sought in the hypothesis of residual rock magnetization occurring during tectonic processes. With a view to such solution, the author has studied the secular and day variations of geomagnetism in anomalous areas and found a relationship between the intensity of variations and the values of magnetic force; an investigation of telluric currents also became necessary. In practical geological questions, in mapping structures, and in interpreting magnetic data, a small number of magnetic surveys and a comparison with gravity data should suffice. The comparison can be made in terms of the "local magnetic constant $g = \sqrt{H^2 - (-\frac{Z}{2})^2}$, analogous to gravity density. The relief map of K.M.A. quartzites plotted according to this method coincides fully with the local geology. - V. S.

7288. Fleming, J. A. Researches in Terrestrial Magnetism and Electricity at Department of Terrestrial Magnetism, Carnegie Institution of Washington, for the Year April 1942 to March 1943. Nat. Research Council, Am. Geophys. Union, Trans. of 1943, pt. I, Washington, D. C., 1943, pp. 229-234.

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The Carnegie Department of Terrestrial Magnetism has restricted its ordinary program during the year 1942-43, devoting much attention to war problems. The topics of principal research are reported under six headings: (1) Geomagnetic investigations: world distribution of magnetic anomalies, world isoporic charts, tables to correct field observations for post-perturbation and annual variation, reduction of field observations to mean of day on a world scale, notes on isomagnetic charts, etc. (2) Geoelectric investigations: relative effects of the wind on the two signs of conductivity, comparison of simultaneous atmospheric-electric data on sea and land, electrode effect in the atmosphere, etc. (3) Nuclear physics: pressure electrostatic generators, tests of magnet and vacuum systems for the 60-inch cyclotron installation, etc. (4) Observatory work: geomagnetic, geoelectric, ionospheric, and meteorological observations at Huancayo and Watheroo Magnetic Observatories; correlation of geomagnetic, ionospheric, and auroral work in polar regions at the College Observatory, Alaska; etc. (5) Survey work: determination of secular variation and new distribution data chiefly by the cooperating agencies, etc. (6) Ionospheric investigations: measurement of intensity of the earth's magnetic field in the ionosphere, observations during magnetic storms, etc. The Department's activities are set forth in greater detail in the Year Book No. 41 of the Carnegie Institution of Washington. - V. S.

7269. Hallimond, A. F. Magnetic Explorations by the Geological Survey. Abs., Proc., Geol. Soc. of London, London, sess. 1941-42, Nos. 1381-1388, 1942, pp. 58-59.

Magnetic exploration was begun in England by the Geological Survey in 1928. Several typical examples are described: Swynnerton Dykes, Blairgowrie Dykes, and Brockhill Dykes in Shropshire; Melton Mowbray and Mount Sorrel; Furness and Cumberland; and Whin Sill on the southern slope of Mickle Fell. Laboratory determinations and methods of interpretation are discussed briefly. A bibliographical list is appended. - V.

7270. Howe, H. H. On Spontaneous Increase of Magnetic Moments. Nat. Research Council, Am. Geophys. Union, Trans. of 1943, pt. I, Washington, D. C., 1943, pp. 222-226.

Magnets are known gradually to loose their strength, but instances have been observed when magnetic moments increased with time. For example, in 1940 the Cooke magnetometer used at the Tucson Observatory has shown an increase of nearly one-half percent in magnetic moment during the preceding 18 months. The author and J. H. Nelson indepently plotted the log M_{20} and the temperature against the time. (The moment

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M_T, is here corrected for temperature by adding 0.00008 to log M for each degree that the temperature exceeds 20° C.; this value is designated as M_{20}. The resulting curves showed that the increase in moment occurs during the summer but not during the winter. Nelson also observed that if the temperature and the "adjusted" log M_{20} be regarded as sine curves, they are approximately 90° out of phase. Analyzing this observation, the author concludes that the rate of change of log M_{20} is a linear function of temperature. As a physical explanation, he offers three suggestions. Among them is his hypotheses that the rate of increase depends on the external mean temperature and the temperature range. - V. S.

271. Jones, W. M. Magnetic Disturbances on the Canterbury Plains. New Zealand Jour. of Sci. and Technol.; B. General Section; Wellington, N. Z.; vol. 23, No. 3-b, 1941, pp. 73b-83b.

Variations of vertical magnetic intensity over a range of 750 gammas were found on the Canterbury Plains to the west of Christchurch, notably in the Wigram and Burnham districts. West of Burnham, variations up to 45' in declination also were detected. The exposed basalts of the Lyttelton volcano produce disturbances of at least 11,000 gammas in the vertical intensity and 30° in declination, and parts of the disturbances on the plains are attributed to the extension underground of the Lyttelton volcanics. - Author's abs.'

272. Knapp, D. G., and Howe, H. H. Magnetic Observatory Results at Honolulu, Hawaii, for 1931-32 and 1933-34. U. S. Coast and Geodetic Survey, Washington, D. C., MO-11, 1942, 119 pp., and MO-14, 1943, 114 pp.

These publications contain extensive tables of observatory results, reproductions of magnetograms showing the more important magnetic storms, and an explanatory text. The tabulated results include hourly mean values of the magnetic elements D, H, and Z, summaries of their monthly and annual means, collected mean diurnal variations for each month, season, and year, lists of principal magnetic disturbances, amounts of non-cyclic change, observed and adopted base-line values of the D, H, and Z variometers with their abrupt changes, etc. The text includes a description of instruments, discussions of their coefficients and behavior and of the procedures used, and explanations of the various tables. - Authors' abstract.

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7273. Northern Miner. Metalore Resumes Drilling on Magnetometer Results. Toronto, vol. 29, No. 37, 1943, p. 14.

A magnetometer survey was conducted by the Metalore Mining Corporation, Canada, on its property in the end of 1943. Iron sulfide ha been discovered in this area, and a search was made for copper. The survey covered two areas adjoining Normetal Metals. Magnetic anomal were found in four places. These will be drilled during the winter 1943-44. - V. S.

7274. Rieseberg, H. E. A New Gold Locating Device. The Min. Jour., Phoenix, Ariz., vol. 27, No. 13, 1943, p. 5.

The author describes R. Krahmann's magnetic balance. This instrument was originally devised for locating small shallow mineral deposits, but it also proved useful in detecting gold beds. Through its op ation, new discoveries were made in the Main Reef of the Rand goldfiel South Africa, and in the Yellow-Knife area of the Great Slave Lake ter tory, Northern Canada. The instrument detects the magnetic gold-bear rocks underground and, apparently, under water. A magnet in the appa tus dips gradually as it approaches the area in which a magnetic ore re until it comes over the center of the ore mass. The movement is infin tesimal, but it is magnified by a mirror fixed to the magnet, so that it may be read on a scale. A drawing illustrates the apparatus. Two operators are required for the use of the magnetic balance. The field procedure is briefly outlined. - V. S.

7275. Rigal, Remigio. El Yacimiento de Magnetita de Hierro Indio y C Menores del Departamento San Rafael, Provincia de Mendoza (Magnetite Deposits of Hierro Indio and Other Minor Mines of th Department of San Rafael, Province of Mendoza). Direccion de Minas y Geologia, Boletin 52, Buenos Aires, 1942, pp. 9-11.

A brief account is included of magnetometric investigations of magnetite in Argentina. Magnetite deposits were first explored by S. Waessman in about 1925; he worked in the La Carreta mountains, Catamarca Province. R. Rigal made more recent studies in the Hierr Indio mines region. The magnetometer of Thalen-Tiberg, modified by Dahlblom, was used. Magnetic maps were prepared of vertical intens in the areas surveyed. - V. S.

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276. Swainson, O. W. Magnetic Work of the United States Coast and Geodetic Survey from April 1942 through March 1943. Nat. Research Council, Am. Geophys. Union, Trans. 1943, pt. I, Washington, D. C., 1943, pp. 226-229.

The U. S. Coast and Geodetic Survey devoted most of its work during he past year to gathering, processing, and compiling information useful n the conduct of the war. The principal activities were as follows: (1) Magnetic surveys: a new isogonic and isoporic chart of the Caribbean Sea rea has been prepared; the work in the American Republics was continued; n the United States, observations were made in the extreme western and outhwestern States. (2) Office work: magnetic data were furnished to early every mapping service in the Government; observations at ob- ervatories, magnetic tables and charts, and directions for testing compass ses were prepared for publication. (3) Instrumental work: a modifica- ion of a special Z-type magnetometer for supplanting the earth-inductor s in preparation; magnetograph recorders equipped with gold ribbon have een constructed. (4) Observatories: the five magnetic observatories of e Survey - Cheltenham, Honolulu, San Juan, Sitka, and Tucson - continued operation without interruption. - V. S.

3. SEISMIC METHODS

277. Ayres, L. G. Ups and Downs in Seismograph Field Operations. Mines Magazine, Denver, Colo., vol. 33, No. 10, 1943, pp. 535-537.

The author briefly describes the technique of seismograph field erations on a solid terrain and in the exceptionally difficult conditions the Louisiana swamp country. - V. S.

278. Blake, Archie. The Non-Invariantive Character of the Iso-p Surface as an Iso-P Surface in the Statistical Interpretation of Geophysical Data (Abs.). Nat. Research Council, Am. Geophys. Union, Trans. of 1943, pt. I, Washington, D. C., 1943, p. 60.

The writer objects to establishing in geophysical research a class "significant" observations in which the prior probability does not pear. In the present paper he states one of the objections to this method; s criticism is mathematical. The inverse probability of an observation a three-dimensional space is designated as "p." The problem is to fine a surface that shall divide the points of this space into two sub- asses - the significant and the insignificant. A part of the definition the surface is that the integral of "p" over the significant points shall

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have a prescribed value "P;" accordingly, the surface is called an "is surface." This condition is not sufficient for determining the surface. Such difficulty often is obviated by the method of "fiducial probability" defining the iso-P surface as coinciding with an iso-p surface that cuts off the desired integral P. However, this method does not meet the requirement of invariance; the iso-p surface may assume very different shapes not coinciding with the transforms of the iso-P surface initially defined in terms of them. The requirement of invariance is better satisfied by the method of inverse probability based on the formula of Bayes for the probability of a hypothesis after an observation. This formula discussed briefly. The explicit treatment of prior probability gained b this latter method has the advantage that its results do not depend on t choice of statistics and in this sense are not predetermined. - V. S.

7279. Bodle, R. R. Additional Evidence for High-Speed Surface Waves over Atlantic Paths. Nat. Research Council, Am. Geophys. Unio Trans. of 1943, pt. I, Washington, D. C. 1943, pp. 57-59.

High-speed surface waves have been observed over Pacific path Bermuda's records of earthquakes on November 10, and 28, 1942, sho high-speed surface waves likewise over Atlantic paths. The rate of tr in these records is very near the upper limit for transverse surface w 4.67 km/sec. In support of the Bermuda evidence, the writer presents table, "Summary of data on earthquakes involving high-speed surface waves over Atlantic Ocean." This table indicates that high-velocity s face waves are observed over the Atlantic paths, which are largely la routes. It also shows that these waves may be missing on some Atlan paths; however, the latter evidence is weak. - V. S.

7280. Bravinder, K. M. Los Angeles Basin Earthquake of October 21 1941, and Its Effect on Certain Producing Wells in Dominguez Field, Los Angeles County, California. Bull. Amer. Assoc. Pet Geologists, Tulsa, Okla., vol. 26, No. 3, 1942, pp. 388-399.

An earthquake occurred on October 21, 1941, in the Los Angele Basin. Its epicenter was in the Newport-Inglewood zone, about 3 mile southeast of the Dominguez oil field. This shock damaged the casing 15 flowing wells in the field, so that a 1 1/2-inch dummy pressure bo could not pass through the inside of the 2 1/2-inch tubing. In 6 wells, significally, the bore was found to intersect the plane of a south-dippi reverse fault close to the point of damage. The author concludes that total evidence indicates a growth of the comparatively young Dominguez structure, probably as a result of continued lateral movement along t

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lewport-Inglewood line of sheer. In this process, areas of unrelieved tress are continually being formed. Some such stress was relieved by he earthquake of October 21, 1941. This relief and the resulting damage the wells must have occurred by means of a movement along the above-dicated reverse fault. - V. S.

281. Bullen, K. E. The Ellipticities of Surfaces of Equal Density in the Earth's Interior. Tans. and Proc., Royal Soc. of New Zealand, Wellington, vol. 72, pt. 2, 1942, pp. 141-143.

In previous works, the author discussed ellipticities of surfaces of qual density within the earth's interior. Figures for these ellipticities ere based on the earth's density variation. Since then there have been mprovements to travel timetables of seismic waves that have affected ensity values. In the present paper, the author analyses the consequent lterations in ellipticity figures. The new figures are presented in a able; they are found to be very close to the previous figures, the maxi-um change in the outer mantle of the earth being 0.00002. The effect n ellipticity corrections to the travel times of seismic waves is found be negligible. It will be greatest with PKP for a ray that has passed hrough the earth's center. But even there, it should not exceed 0.1 econd. This deviation is within the limits of precision of the ellipticity ables. It is therefore unnecessary to modify at all any of the previously ublished ellipticity corrections to the travel time of earthquake waves. he paper is accompanied by a bibliography of the author's previous orks on ellipticity. - V. S.

282. California Institute of Technology. Cooperative Researches at the Seismological Laboratory. Carnegie Inst. of Washington Year Book No. 41, 1941-42, Washington, D. C., 1942, pp. 102-106.

The Seismological Laboratory at Pasadena, Calif., in 1941-42 tudied the region of southern California in respect to local earthquakes, hickness and nature of mountain-formation, quantitative relations between he magnitude, intensity, and acceleration of earthquakes, earthquakes d structure, differences in travel times, propagation of sound waves, c. The conclusions of some of the papers are outlined; attention is iven to the work of B. Gutenberg and of C. F. Richter. Several earth-akes in southern California are listed. The local stations have been in ntinuous operation during the year; the precision of their data and of e data of cooperating stations in the Southwest has improved. A "Chroni-l Conspectus of Seismologic Stations" has been published by H. O. Wood; contains information on more than 800 stations in different parts of the orld. A part of the time of the personnel has been devoted to war oblems. - V. S.

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7283. Cappelletti, M. S. El Sismógrafo Argentino Construído en los Talleres de Mecánica de Precisión de la Dirección de Meteorolog Geofísica e Hidrología (The Argentine Seismograph Constructed i the Mechanical Precision Shops of the Department of Meteorology Geophysics, and Hydrology). Proc., Eighth Am. Sci. Cong., 1940, Washington, D. C., vol. 7, Physical and Chemical Sciences, 1942, pp. 67-69.

The Department of Meteorology, Geophysics, and Hydrology, Argentine Ministry of National Agriculture, has constructed a horizonta component seismograph of the Mainka type. A detailed description of the instrument is given, illustrated by two photographs. - V. S.

7284. Dake, H. C. The Core of the Earth. The Mineralogist Magazine, Portland, Oreg., vol. 11, No. 8, 1943, pp. 244-245, 252-254.

A general discussion of the core of the earth is concluded with a brief summary: "(1) The central core has a diameter of some 4,000 miles. Its composition is essentially iron 90% and nickel 7%, with a specific gravity of around 10.00, the discrepancy over normal iron bei charged to pressure. (2) Next comes a layer of magnesium iron silicate about 1,000 miles thick and of intermediate density. (3) Next is a layer of peridotite rocks about 1,000 miles thick, with a specific gravity of close to 4.00. (4) Finally, the outer crust, with a specific gravity of from 2.75 to close to 4.00, and of varying composition and nature. (5) The inner metallic core comprises about 75% of the total weight of the earth. (6) The increasing density of the earth dampens and impedes the free passage of seismic waves. Hence, earthquake vibrations do not pa directly through the core, but tend to follow along the lighter outer crus (7) The relatively vast deposits of iron minerals found in the crust of the earth represent less than 5% of the total amount of iron assumed to be present in the earth." - V. S.

Eby, J. B. Geophysical History of the Iowa Field, Calcasieu and Jefferson Davis Parishes, Louisiana. Geophysics, Menasha, Wis., vol. No. 4, 1943, pp. 348-355 (see Geophys. Abs. 7256).

7285. Finch, R. H. The Seismic Prelude to the 1942 Eruption of Mauna Loa. Bull. Seismol. Soc. Am., Berkeley, Calif., vol. 33, No. 4, 1943, pp. 237-241.

The author describes the activities that preceded Mauna Loa's eruption of 1942 and foreshadowed its occurrence: (1) Summit activity

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1940, ordinarily followed by flank eruptions in about 2 years; (2) the igration of epicenters of earthquakes along the NE-SW rift beginning ebruary 8, 1942; (3) a swarm of earthquakes along the northeastern t on February 21; (4) a large number of shakes in February and March; large fluctuations of the E-W tilt in March, indicating that molten lava as approaching the surface; and (6) short-lived activity at the summit on pril 26, usually preceding a flank eruption by 2 to 3 days. The flank uption started on the northeast rift on April 28, 1942. (For a descrip- n of the eruption, see Geophys. Abs. 113, No. 6915.) - V. S.

56. Gamburtsev, G. A. Instruments for Seismic Prospecting and Methods of Improvement (abs.). Internat. Geol. Cong., 17th sess., U.S.S.R., 1937, Abstracts of Papers, Moscow, 1937, pp. 189-190.

Mechanical and electromechanical oscillating mechanisms are scussed with a view to perfecting seismic instruments. The author velopes a theory of linear oscillating systems with many degrees of eedom. This theory is based on a formulation of the conditions to be tisfied by bi-polar mechanical elements, and a consequent representa- n of mechanical systems by closed contour lines. Linear algebraic d differential equations are evolved for the sum of relative velocities elements belonging to a mechanical contour and for the equilibrium forces about the key points of the contour. Such equations are given r static and dynamic conditions of mechanical systems. This theory applied to problems of the filter seismograph, recording of refracted d reflected waves, etc. The idea is suggested of a bi-polar mass, ich in one of its variants is a kind of double pendulum. - V. S.

87. Germain-Jones, D. T. Seismic Refraction Technique (abs.). Proc., Geol. Soc. of London, Session 1941-1942, London, Nos. 1381-1388, 1942, pp. 59-60.

Refraction surveys have been made in southwestern Iran. At first, iclinal folds were located in the Asmari limestone by observations of e traverses, but this approach proved slow and ineffective. Better gress was made with the discovery of the arc-method. Subsequent raction work located an Asmari anticline on the southwestern side of salt- and gypsum-bearing Lower Fars series, beneath an adjoining face syncline. This Asmari anticline was not predictable by ordinary logical methods owing to the discordant relationship of the overlying wer Fars. The surface indications had lead geologists to place this icline beneath the Lower Fars proper, rather than on the side of it, at epth not exceeding 3,000 feet. - V. S.

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7288. Gutengerg, Beno. Seismological Evidence for Roots of Mountain
Bull. Geol. Soc. Am., Washington, D. C., vol. 54, No. 4. 1943,
pp. 473-498.

Theoretical problems concerned with the calculation of the veloci of seismic waves in the various layers of the earth's crust and the dete nation of the thickness of such layers are discussed. The results are a plied to seismograms obtained from artificial explosions, and sources error in interpretation are investigated. Seismograms registered in different parts of the earth from epicenters less than 1,000 km. from stations are used to investigate the layering in these regions and the pr blem of mountain roots. The bearing of the findings on the theory of isostasy is discussed. - Author's abs.

7289. Heck, N. H. The Role of the Western Hemisphere in Seismology Under Present-day Conditions. Proc., Eighth Am. Sci. Cong., 1940, Washington, D. C., vol. 7, Physical and Chemical Sciences, 1942, pp. 57-62.

Seismological research has been restricted by the war to the western hemisphere. Fortunately, the Americas provide the greatest opportunities in this field. (1) The portion of the earthquake belt surrounding the Pacific has 20,000 km. of its extent in the Americas. In addition, there are minor belts in eastern North American with a lengt of 4,700 km. and some submarine belts within the range of American stations. (2) The western hemisphere possesses altogether 94 seismo graph stations; the instruments are of many kinds and were standard a the time of their installation. It is true, only California and New Engla are wholly provided for local earthquakes; more stations are particula desirable south of the equator. (3) The earthquakes in the Americas a numerous and range over all grades of intensity. A recent report on E Salvador lists, on one occasion, 28 earthquakes in 10 days; very great earthquakes occurred at New Madrid, Miss., 1811, and Charleston, S. 1886. (4) The earthquakes of the western hemisphere offer a great variety of problems; the author briefly describes some of them and enumerates others. - V. S.

7290. Hercules Powder Co. Seismograph Dynamite. Mines Magazine Denver, Colo., vol. 32, No. 11, 1942, p. 607.

The Explosives Department of the Hercules Powder Co. has dev oped a new cartridge of seismograph dynamite known as "Spiralok." The dynamite is packed in a strong paper shell equipped with a spiral

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thread. This cartridge has a standard length. In loading, a stout spiral-grooved sleeve is screwed over the external halves of two adjacent cartridges until they butt together. A series of joined cartridges provides a complete seismograph-shot charge. It forms a strong, rigid column and makes unnecessary the stringing, lathing, taping, and pegging commonly used in loading a hole. - V. S.

7291. Kornfeld, J. A. Peace Creek Field - a Stratigraphic Trap. World Petroleum, New York, vol. 14, No. 13, 1943, pp. 38-47.

The Central Kansas Uplift may become a proving ground of prospecting techniques for the discovery of stratigraphic traps because this area is easily explored. As an example, the author describes exploration in the Peace Creek district on the southeastern flank of the uplift, where 3 important oil fields and 2 gas fields have been developed from stratigraphic reservoirs. Reflection seismograph surveys provided the initial indications for the drilling tests. A number of tests were drilled beyond the area's productive limits, before the Snowbarger well showed oil. The immediate basis of the discovery was subsurface geologic mapping guided by reflection seismograph data. Other discoveries followed. The Peace Creek stratigraphy and structure are described and illustrated by maps. The principal controlling factor in oil-accumulation seems to be the presence of porosity and permeability in the producing limestone formation. - V. S.

7292. Landowners Royalties Co. Does the Seismograph Work? Montana Oil and Min. Jour., Great Falls, Mont., vol. 23, No. 31, 1943, p. 4.

Oil discovery by seismograph crews in northern Montana included the following: (1) Stanolind Co. found a structure in Pondera County at present producing at the Midway oil field. (2) Heiland Research Co. discovered in the Midway district a still higher structure; the Wood well is nearby, and the largest producing well, Hageman-Pond-Rispin No. 1, is about 40 feet lower. In Pendroy's vicinity is situated the Emrick fault; oil has been found on both sides of it. The Jarvis and Taylor-Goggins well is drilled on the high side of this fault near a Madison contace "high." (3) Shell Oil Co. found the Willow Creek structure, Teton County, on the east face of the Rocky Mountains. (4) Texas Co. ran a profile across the northern Sweetgrass Arch and another profile in Pondera County; the latter profile has spotted in the Midway area the Schlepp No. 1 and the Texaco-Kiel wells. (5) General Petroleum Co. has worked on the western flank of the Sweetgrass Arch, Teton County, but the results are not yet known. - V. S.

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7293. Legge, J. A., Jr., and Rupnik, J. J. Least Squares Determination of the Velocity Function $V = V_o + kz$ for Any Set of Time-Depth Data. Geophysics, Menasha, Wis., vol. 8, No. 4, 1943, pp. 356-361.

A method is presented by means of which a least square fit of the circular ray path plotting function to time-depth data is obtained. An example is worked out illustrating the application of the method to an actua case. - Author's abs.

7294. Lynch, W. A., and Dillon, Vincent. The Deep-Focus Earthquake o May 19, 1940, in the Sea of Okhotsk. Bull. Seismol. Soc. Am., Berk Calif., vol. 33, No. 4, 1943, pp. 251-267.

The writers have studied the earthquake of May 19, 1940, in the Sea of Okhotsk. Their material consisted of original seismograms from 28 stations and reports from 78 other stations. The epicenter was locat at geocentric latitude 49°50′ ± 7′ N; longitude 148°58′ ± 10′ E. The origin time has been determined by the method of Sohon, as modified by Gutenberg and Richter; the data are tabulated. The depth of focus was calcula for the interval pP - P; the table of Gutenberg and Richter was used, an the data are cited. Intervals sS-S gave a depth of the same order of ma nitude, but large deviations occurred. Travel curves were drawn for th phases P, PcP, pP, S, ScS, sS; the arrival times and phases are tabulate V. S.

7295. Mei, A. I. The Amplitude Ratio, PP/P, as Recorded by Galitzin Seismographs. Bull. Seismological Soc. of Am., Berkeley, Calif., vol. 33, No. 3, 1943, pp. 149-195.

A method was sought for distinguishing between Pacific and continental seismic reflections. For this purpose, a study was made of the ratio of the amplitude of the longitudinal wave reflected at the surface the earth to that of the direct wave, as recorded by Galitzin seismograp At the start, it was theoretically assumed that equal energy is radiated all directions from the source. For empirical evidence, the records of 194 earthquakes were analyzed. The computations showed that the amp tudes of waves recorded on Galitzin instruments do not afford a means o distinguishing between reflections at a layered surface (continent) and a unlayered surface (Pacific). A control comparison of the records of th vertical Benioff and the Galitzin seismographs showed no appreciable d ference. The results were not limited, however, to these negative findi Two stations using Galitzin seismographs were found to be situated at t same distances from eight Mexican epicenters and were receiving

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impulses over the same kind of continental path. Their PP/P ratios revealed that energy is not sent out equally in all directions from the source, as assumed, and that the mechanism at the focus plays an important part in these ratios. - V. S.

7296. Neumann, Frank. Progress-Report on Seismological Activities of the United States Coast and Geodetic Survey, April 1, 1942, to March 31, 1943. National Research Council, Am. Geophys. Union, Trans. of 1943, pt. I; Washington, D. C., 1943, pp. 88-91.

This report covers the following seismological activities of the U. S. Coast and Geodetic Survey: (1) Teleseismic work: about 25 stations cooperating with the Survey continued in operation; in the United States, five stations installed Benioff three-component seismographs. (2) Earthquake-information service: no earthquakes of outstanding importance were reported from the Pacific Coast and Western Mountain States; moderate shocks occurred in New England and on Lake Erie. (3) Strong-motion work: the 53 strong-motion stations of the Survey and cooperating agencies continued in operation. (4) Vibration work: on the west coast, observations were made of buildings, blasting operations, and heavy machine vibrations, in part in connection with defense projects. (5) Miscellaneous seismological information from the U. S. A., Ecuador, Venezuela, Colombia, Bolivia, Peru, Chile, etc. - V. S.

7297. Ricker, Norman. Further Developments in the Wavelet Theory of Seismogram Structure. Bull., Seismological Soc. of Am., Berkeley, Calif., vol. 33, No. 3, 1943, pp. 197-228.

In this paper, the wavelet theory of seismogram structure previously proposed by the author (see Geophys. Abs. 104, No. 5929) has been extended to obtain the form of the seismic disturbance (due to a sharp seismic pulse) at various distances from the source. The solution of Stokes's differential equation is given in the form of a series of wavelet functions, and calculated seismograms are presented to show the manner in which the shape, breadth, and amplitude of the disturbance vary with the distance from the source. Tables are given of the wavelet functions and wavelet-form functions used in the calculations. - Author's abs.

7298. Science News Letter. Earthquake Waves Clocked. Washington, D. C., vol. 43, No. 18, 1943, p. 286.

The St. Georges, Bermuda, seismograph station has measured the velocity of earthquake waves moving over the bottom of the Atlantic

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(see Geophys. Abs. 7279). Such measurements were made in Norway also. The results showed that the velocity averaged about 4.5 km/sec. - V. S.

7299. Ulrich, F. P. Progress Report of Seismological Work by the United States Coast and Geodetic Survey in the Western United States during 1942. Bull. Seismol. Soc. Am., Berkeley, Calif., vol. 33, No. 4, 1943, pp. 281-293.

The seismological report of the U. S. Coast and Geodetic Survey for the western United States for 1942 covers the following activities: (1) Collection of earthquake information: earthquake activity was found to be below normal; 12 principal shocks are described; the number of cooperative reporters has increased by 5,000; etc. (2) Sensitive-seismograph work: 11 sensitive-seismograph stations were operated in the Rocky Mountain and Pacific Coast States, cooperatively or independently; the list is included. (3) Strong-motion work: measurements of accelerations of gravity have been completed; 43 accelerographs, 6 displacement meters and 11 Weed strong-motion seismographs were operated cooperatively or independentently. (4) Tiltmeter work: 3 tiltmeters at Berkeley and 1 tiltmeter at Long Beach were operated; tiltgrams are reproduced in the text. (5) Vibration work: observations on buildings and on the ground, as well as observations of machinery, were made. (6) Instrumental changes: insensitive attachments have been installed; instrumental periods changed in southern California; shaking-table tests were completed. (7) Washington Office: Earthquake History of the United States, 1940, has been published; processing of part of the records of teleseismic stations and double integration of accelerograms were advanced. - V. S.

7300. Weiss, Oscar. The Causes of Rockbursts. South African Min. and Eng. Jour., Johannesburg, vol. 53, pt. 2, No. 2592, 1942, pp. 103-107.

Rockburst is defined as a sudden failure of rocks surrounding mine excavations. The author considers the cause of rockburst as being primarily a release from confining pressures. In rocks, the stresses are not uniformly distributed, as hydrostatic pressures, and produce permanent deformations. Some distributions of stress generate gradual accumulations and sudden releases, resulting in rockbursts. Other distributions generate only tremors. On the Kolar goldfield, some 13,000 tremors were recorded by seismographs in 1 year, but the number of rockbursts was only 0.6 percent. The condition of rock material is then not the only cause of rockbursts, as is often supposed. The most important factors

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e the confining pressures of the surroundings and the resulting distri-
tion of the differential pressures acting on the rock mass. The author's
periments show that a fracturing of rocks will occur, not where the
essure is the highest, but where the release from confining pressures
the greatest and most sudden. (A review of this paper appears in the
ining Magazine, London, vol. 67, No. 6, 1942, pp. 337-340). - V. S.

4. ELECTRICAL METHODS

01. Cohee, G. V. Use of Electrical Logs in Subsurface Studies in Indiana. Proc., Indiana Acad. of Sci., 1942, Notre Dame, Ind., vol. 52, 1943, pp. 163-165.

In an electric log, two types of diagrams can be obtained - a record self-potential generated naturally in a drill hole, and a record of resis-
ity showing the difference in potential at two electrodes from an electri-
l current conducted into the ground. Self-potential is the result of
ectrofiltration and electro-osmosis; electrical resistivity varies with
e physical nature and water content of rocks. These phenomena are
scussed briefly. The electric log of a well thus characterizes the litho-
gy of the formations, the fluid content of the strata, and the porosity of
yers. It gives a measurement of the depth to various key horizons of
bsurface formations; coal horizons can be determined and correlated.
proximately 500 oil and gas test wells have been electrologged in
diana; examples of logs are presented, and their local problems are
dicated. Application of electrical logging to water wells is planned in
inois and Missouri. - V. S.

02. Dickey, P. A. Natural Potentials in Sedimentary Rocks. Am. Inst. of Min. and Met. Eng., New York, Tech. Pub. 1625, 1943, 10 pp.

Potential differences between strata of shale and sandstone have
en recognized for about 15 years, and they form the basis of the electri-
logging of oil wells. Hitherto, these potentials have been ascribed
ely to electrochemical reactions caused by the disturbing effects of the
ter in the drill hole through which they are generally measured. Ob-
rvations by the author in wells empty of water and in a mine shaft
ggest that potential differences between sandstones and shales are
tural and specific properties of the rocks, although they are modified
measurement by the disturbing effects of the water in the drill hole.
e cause of these potentials probably is to be sought in the relative
lar adsorptive capacities of quartz and clay particles. - Author's abs.

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7303. Hagan, W. W. Electrical Earth Resistivity Surveys. Proc., Indiana Acad. of Sci. for 1942, Notre Dame, Ind., vol. 52, 1943, pp. 166-168.

An electrical earth-resistivity survey determines air average apparent resistivity to various depths at different stations. Four electrodes are placed on the ground in a straight line at equal distances. Then, a commuted current is conducted into and through the ground between the two outer electrodes, and the voltage drop is measured betwe the two inner electrodes. The depth to which each reading is taken is determined empirically by the separation of two adjacent electrodes. formula for the determination of the average apparent resistivity of th entire thickness of material between the inner electrodes is: $\rho = 2$ a V/I, where ρ equals the apparent resistivity, "a" the distance betwe adjacent electrodes, "V" the voltage drop or potential between the inn two electrodes, and "I" the true current through the ground. The inst ment and procedure are described. The Illinois State Geological Surve has used this method for locating ground water in sand and gravel. Th Indiana Division of Geology, Department of Conservation, likewise pro poses to use this method for locating ground water. - V. S.

7304. Hawley, P. F. Fault Location by Electrical Prospecting - An Example. Geophysics, Menasha, Wis., vol. 8, No. 4, 1943, pp. 391-403.

Electrical resistivity surveys were run in an area near Campbe Hunt County, Tex., across a known fault of the Mexia system. Lateral inhomogeneity of earth resistivity was investigated by employing cons depth surveys, using the Wenner configuration with 1,000-foot spacing between adjacent electrodes. Five depth surveys were made using th Wenner configuration at electrode spacings up to 4,000 feet. These de surveys were interpreted by using 3-layer curves interpolated from t Wetzel-McMurry data. The interpretations checked reasonably well against resistivity logs in two 350-foot core holes in the region. The constant-depth profiles cannot be said to have definitely indicated the presence of the fault, but a thin high-resistance bed participating in t faulting was clearly delineated by the depth surveys and could be used locate the fault. - Author's abs.

7305. Hefley, D. G., and Fitzgerald, P. E. Selective Acidizing and P meability Determination by an Electrical Method. Am. Inst. of and Met. Eng., Tech. Pub. 1604, New York, 1943.

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An apparatus has been developed that permits selective acidizing producing formations and determination of the relative permeability a formation by fluid injection. This apparatus, known as the "electric lot," is an electrical fluid-interface locator, the electrical circuit of ich is completed when the electrodes in the well are in contact with a nductive fluid but is not completed when immersed in a nonconductive id. Results are given for a number of typical acidizing applications in ich the interface locator was used to control the acid. Description of e method used in making a permeability survey and the data obtained so are included. - Author's abs.

06. Jarvis, W. L. Standardization of Electrical-Log Headings. Oil and Gas Jour., Tulsa, Okla., vol. 42, No. 27, 1943, pp. 238-242; also, California Oil World, Los Angeles, Calif., vol. 36, No. 23, 1943, pp. 5-8.

The API California District Subcommittee on Core Analysis and ectrical Logging has developed a standardized heading for electrical gs that alters and amplifies existing forms. Such a heading is desirable make descriptions uniform and to facilitate interpretations. It was idely circulated for suggestions among oil men and represents a broad nsensus of the California industry. The number of the entries is limited an essential minimum compatible with a full utilization of information. e author presents the new standardized form and discusses its entries th respect to purpose, use, and terminology. - V. S.

07. Koenigsberger, I. G. Surface Geology and Determination of the Center and Surface Depth of a Disturbing Body, or Plane, by Geophysical Methods Following the Potential Theory (in Russian). Internat. Geol. Cong., Rept. of the 17th sess., Moscow-Leningrad, 1937, vol. 4, Moscow, 1940, pp. 463-484.

Geologic problems of tectonics and magmatic intrusions can be proached by two kinds of geophysical methods - those based on the ory of the potential and those using waves. The potential theory provides the problem of the center and surface depth of a disturbing body, three sic rules that are outlines. - V. S.

08. Roach, C. B. Subsurface Study of Jennings Field, Acadia Parish, Louisiana. Bull. Am. Assoc. Petrol. Geol., Tulsa, Okla., vol. 27, No. 8, 1943, pp. 1102-1122.

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Jennings field is one of the major producing centers on the Louisi Gulf Coast. It is on a piercement-type salt plug surmounted by a thick rock. A geological study was made of its stratigraphy, structure, sand mineralization, and petroleum accumulation. Electric logs served as t main basis of the investigation. Only a few logs of the shallow superca wells were available, but electrical surveys were made of almost all fi wells. Unfortunately, these surveys were rarely performed before ce- menting the surface casing at approximately 1,500 to 1,700 feet. - V. S.

5. RADIOACTIVE METHODS

7309. Alder, R. L. Recompletions Based on Radioactivity Logs. To- morrow's Tools - Today, Los Angeles, Calif., vol. 9, No. 3, 1943, pp. 10-12.

The neutron and the gamma-ray curves are widely used to locate the limits of productive zones before gun perforating. The two curves are made separately, but both may be run with surface equipment simi to the Electrolog units. In California, almost every major field used radioactivity logs. The Los Angeles Basin has started many work-ove jobs on the basis of radioactivity logs; in the Long Beach field, one company followed radioactivity logs with plug-back and gun-perforatin programs. The Huntington Beach and Santa Fe fields have used radio- activity logs in stratigraphic studies. The San Joaquin Valley requires preferably a combination of both the neutron and gamma ray logs. A tested procedure of radioactivity logging in the case of recompletion is described. The paper is illustrated by samples of logs. - V. S.

7310. Dobrotin, N. A., and Frank, I. M. Radiation Receiver with Redu Sensitivity to the Position of the Source. Compt. Rend. (Doklady de l'Acad. Sci. de l'U.R.S.S., Moscow, vol. 39, No. 2, 1943, pp. 49-52.

The measurement of radiation within a solid angle offers specia difficulties. Such is the case when nonpoint sources are compared, or when the position of the source in space cannot be fixed exactly. The precision of measurements often depends here on the accuracy with w the position of the radiating source is known with reference to the re- ceiver. A solution would be to have a chamber in which the current would depend on the intensity of the radiating source but not on its pos tion. A. Piccard and L. Meylan suggested a flat chamber large enough to cover the radiation of the source over an angle of nearly 2π. This apparatus is described and criticised in several respects. A different

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paratus is proposed by the authors. If an absorbing screen is placed tween the source and the receiver, then with a change of distance be- een source and receiver the solid angle subtended by the receiver at e source and the solid angle formed by the cone of the shadow will ange at a different rate. At a certain distance, these changes may mpensate each other. This principle is discussed in several respects; rticularly for the case when a small ionization chamber is switched posite the main chamber, instead of the absorbing screen. - V. S.

11. Hughes, J. D. Radioactivity Logging Provides Valuable Data for Gulf Coast Operations. Tomorrow's Tools - Today, Los Angeles, Calif., vol. 9, No. 4, 1943, pp. 4-9, 34.

Radioactivity logging is used to obtain subsurface data in new wells d to provide information for remedial work in old wells. There are se particular uses in specific situations. Some of them are described:) Uses in new wells: Measurements when drill pipe and electrical log e in disagreement; location of subsurface markers in sections not in- cated by electrical logs; porosity and density measurements by gamma y and neutron curves in areas of consolidated sedimentation; clarifi- tion of uncertain anomalies indicated by electrical logs; data for deepen- operations; accurate logs of cased-off formations for recompletion; utron curves of casing seats in relation to producing horizons; con- ous logs for correlation with other wells; correlations for structural dies; elevations where original zero of electrical log is lost; clarifi- tion of electrical logs when discrepancy is found either at bottom or up e hole; etc. (2) Location of porous streaks: In areas where production btained from porous horizons, as in limestone sections in west Texas, e neutron curve in combination with the gamma-ray curve have been te successful in identifying such horizons. (3) Special Applications of dioactivity Logging: Carnotite studies in squeeze cementing; radio- tive material in drilling fluids for permeability studies; accurate log en fluid conditions will not permit electrolog; accurate log of formation er casing when no electrical log was made. Some of the problems are strated by examples of logs. - V. S.

12. Keevil, Norman B. Radiogenic Heat in Rocks. The Journ. of Geol., Chicago, vol. 51, No. 5, 1943, pp. 287-300.

Results of hundreds of new radioactivity determinations on rocks minerals plotted on frequency-distribution curves lead to lower pro- le rates of heat production than were estimated previously. This may due in part to unrepresentative sampling, and the need for more

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abundant data is emphasized. For this purpose analyses for radium alo are not satisfactory. A rapid means of obtaining the rate of heat produc tion from a single measurement of the rate of emission of α-rays, deve oped in 1939, is described and applied. Owing to similarity in the rates of α-ray emission and in the rates of production of heat of the thorium and uranium series at their normal abundance ratios in rocks, the rate of heat production from disintegrations in these series may be calculat by means of the single equation, $H^1 = 2.15a$ calories per gram per milli years (Th/UI assumed to be 3.5, and "a" the observed rate of α-ray emission in alphas per milligram per hour). It also appears to be satis factory to assume that the percentage of K_2O equals 2.5a, so that the to heat production, H, equals 2.25a cal/gm/My. - Author's abs.

7313. Keston, A. S. Stable Self-quenching Geiger-Müller Counters Co taining Organo-Metallic Compounds. Rev. of Sci. Inst., Lancaste Pa., vol. 14, No. 10, 1943, pp. 293-295.

Stable self-quenching Geiger-Müller counters may be prepared b filling counter tubes with tetramethyl lead vapor alone at about 2 cm. pressure. These counters are characterized by very wide, usable volt ranges, high resolving power, long plateaus, and good sensitivity. Wid voltage ranges are found where the count is virtually independent of the voltage applied to the tube. A selfquenching property is likewise show to a high degree by mercury dimethyl, and for a short time by iron carbonyl. - V. S.

7314. Kurbatov, L. M. The Radioactivity of Ferro-Manganese Beds a the Determination of the Rate of their Formation by the Radioact Method (in Russian). Internat. Geol. Cong., Rept. of the 17th ses Moscow-Leningrad, 1937, vol. 4, Moscow, 1940, pp. 513-522.

Studies of ferromanganese beds in the seas and lakes of the U.S. chiefly Karskoe Sea, showed the presence of radioactivity. Apparently radioactive elements migrate in the earth's crust and accumulate in s mentary rocks. An analysis of samples from the Karskoe Sea indicate that the radium content varies in different localities and decreases wi the depth of samples. The decrease from surface downward may be a cribed to radium disintegration with time. If the rate of disintegration is known, the age of formations can be determined. Calculations show that this age must be estimated in thousands of years. - V. S.

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315. Mounce, W. D., and Rust, W. M., Jr. Natural Potentials in Well Logging. Am. Inst. Min. and Met. Eng., New York, Tech. Pub. 1626, 1943, 6 pp.

An abstract of this paper has appeared in the Oil Weekly, Houston, Tex., vol. 109, No. 10, 1943, pp. 56-57 (see Geoph. Abs. 114, No. 7057. V. S.

6. GEOTHERMAL METHODS

316. Van Orstrand, C. E. Flow of Heat from an Intrusive Body into Country Rock. Am. Inst. Min. and Met. Eng., Tech. Pub. 1677, New York, 1944, 9 pp.

Metalliferous deposition in intrusive rocks is investigated in its dependence on heat conduction. An intrusive is defined as a mass of igneous rock that has migrated upward into country rock from great depth. The problem is treated in terms of integral calculus. Theoretical equations are derived for the flow of heat from the intrusive into the rock, and numerical calculations are made for particular data. The results are embodied in two tables - (1) values for percentages of the initial differences in temperature between the intrusive and the country rock, and (2) values derived from above percentages for the construction of an isothermal surface. These results show rapid changes of gradient in a relatively thin outer zone of the intrusive. Significantly, rapid cooling must produce a highly fractured zone. The obtained findings lead to the conclusion that the spreading of isotherms is a favorable condition for the deposition of metals (as far as increased tendency toward fracturing is itself a favorable condition); this condition prevails in the cupolas and in the outer shell of the intrusive beyond the "dead line." The concentration of isotherms beneath the troughs of the intrusive is a much less favorable condition for the deposition of metals. - V. S.

7. GEOCHEMICAL METHODS

317. Pirson, S. J. Two-Year Summary of Geodynamic Prospecting Results. The Oil Weekly, Houston, Tex., vol. 110, No. 9, 1943, pp. 23-30.

An abstract of this paper was given in Geophysical Abstracts 114, No. 7068. The following figures can now be added. A total of more than 500 stations has been made during the past two years. They represent over 70 independent surveys performed in 14 different States of the United

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States and Canada. The results are embodied in a table "Geodynamic Exploratory Wells" covering prospecting up to July 1943. These result give the average success of geodynamic exploratory drilling as 1/3. A well is deemed a success when it discovers oil or gas in quantities producible commercially. - V. S.

7318. Trask, P. D., and Patnode, H. W. Source Beds of Petroleum. A Assoc. of Petrol. Geol., Tulsa, Okla., 1942, 566 pp., 72 figs. Price, $4.50.

The object of this investigation was to find means of recognizing source beds of petroleum. Twelve properties of sediments were studie Texture, organic content, carbon content, chromic acid reduction, nitro content, color, assay number, relative volatility, nitrogen-reduction ra oxidation, carbon-nitrogen ratio, and calcium carbonate content. The nitrogen-reduction ratio was found to have a fairly definite relationship to the occurrence of oil; namely, it is generally low in sediments assoc ated with oil zones and high in barren beds. This ratio is of value for prospecting in virgin territory and for extending the limits of known pr duction areas. Volatility and the carbon-nitrogen ratio are also relate to the presence of oil but offer less promise in prospecting. Organic c tent and color of sediments, often regarded as good prospecting indicat were found not to be related to the occurrence of oil. - V. S.

7319. West, S. S. The Analysis of Gases by Scattering of Electrons. Geophysics, Menasha, Wis., vol. 8, No. 4, 1943, pp. 404-418.

Methods are described for the analysis of mixtures of hydrocarb gases by measurement of the probability of scattering of electrons as a function of energy of impinging electron, angle of scattering, or loss of energy during collision. By such means, one can determine carbon-hydrogen ratio, proportions of single and multiple carbon-carbon bonds, and concentrations of gases in a mixture. - Author's abs.

8. UNCLASSIFIED METHODS AND TOPICS RELATED TO GEOPHYS

7320. Blau, L. W. Progress Recorded in Gravitational, Seismic, and Geochemical Methods and in Well Logging. Min. and Met., New York, vol. 25, No. 446, 1944, pp. 118-119.

Research in geophysical methods was reduced during 1943 by the demands of the war; still, some progress was achieved. (1) Gravimet

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Plastics have been substituted for strategic metals in the construction of instruments. The averaging of closures in prospecting can now be made by means of electric networks. At the University of Texas, Austin, sudden changes of deflection have been observed in the records of the local gravity meter; more stations are desirable for a closer study. (2) Seismology: Existing amplifiers have been changed so as to "peak" more sharply; opinions differ as to desirable sharpness. Progress has been reported in the seismic localization of faults. Seismic velocities have been found to vary significantly over distances of only a few miles; accordingly, the mapping of reflection times tends now to supplant the translation of reflection times to depth on the basis of depth curves. (3) Geochemistry: Two oil fields have been discovered in Texas exclusively by means of the geochemical method. One of them is especially interesting because previous core drilling had not indicated favorable structure. (4) Well-logging: A spontaneous-potential dip-meter has become available; it determines the dip of the strata penetrated by a borehole. Placing permanent markers in boreholes is gaining wider acceptance. Gamma-ray and neutron logging are gradually being adopted by the industry. - V. S.

7321. Bruckshaw, J. M. Some Factors Limiting Geophysical Prospecting. Abs. of Proc., Geol. Soc. of London, London, sess. 1941-42, Nos. 1381-1388, 1942, pp. 57-58.

The factors limiting the usefulness of geophysical methods are examined. (1) The gravitational and magnetic methods require that structures possess vertical relief. Even then, a number of different bodies may produce similar effects at the surface and make interpretation difficult. (2) The gravimeter determines total gravity values varying with the inverse square of the depth, whereas the Eötvös torsion balance measures values changing inversely as the cube of the depth. Hence, the large deep-seated structures should be investigated by gravity meters, whereas, the shallow bodies must be explored by torsion balances. Thus, in balance work the topography is the limiting factor; in gravimetric work, it is the instrumental capacity. (3) The seismic and electrical methods suffer from background effects, which must be separated from the influence of the structure. Moreover, in highly faulted areas and in regions of steep dip, the reflection method is at a disadvantage. (4) The electrical method requires the use of alternating current, which impairs penetration into formations, especially in areas of low resistivity. - V. S.

7322. Bugbee, J. M. Reservoir Analysis and Geologic Structure. Trans., Am. Inst. Min. and Met. Eng., New York, vol. 151, Petroleum Development and Technology, Petroleum Div., 1943, pp. 99-111.

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Geophysics can be useful in employing a water drive as a reservoir production mechanism. As faulting on the domes and in the synclines influences water influx, considerations of geologic structure are essential for predicting reservoir performance. All such information as delineation from cores, electrical logs, exploitation data, the study of synclines, the dynamics of formation, etc., should be utilized in determining the geologic configuration. - V. S.

7323. Heiland, C. A. Annual Review: Geophysics. Min. and Met., New York, vol. 25, No. 446, 1944, pp. 61-65.

This review of geophysics during 1943 covers oil exploration, strategic minerals exploration, engineering geophysics, regional geophysical investigations, and manpower and materials situation: (1) OIL EXPLORATION was active, but the pools discovered were small. (a) The monthly average of geophysical parties in the field was about 340; seismic operations led with 75 percent, gravimetric operations were 21 1/2 percent, and other methods made about 3 1/2 percent. Miscellaneous methods showed a slight but steady increase. The gravimeter work decreased slightly from 1941 to 1942 but picked up materially in 1943. The total number of well-logging operations was better than 12,000 in 1941, dropped to about 9,000 in 1942, but is expected to total 11,000 in 1943. (b) The Southern and Southeastern States claimed about 60 percent of activity; Mid-continent States and Western States, about 13 and 12 percent, respectively; the Eastern States and California, 7 and 8 percent, respectively. (c) The annual geophysical outlay was better than $31,500,000, which is only about 12 1/2 percent of the total exploration effort of the industry estimated by A. I. Levorsen at $250,000,000 annually. (d) Geophysics discovered an increasing number of fields each year between 1926 and 1942; the total is approximately 790 for the entire United States, or 9 1/2 billion barrels. In 1942, geophysical methods yielded half of the reserves found by all methods. (e) The average discovery dropped from 46 million barrels in 1931 to 2 1/2 million in 1942. The means of improving the discovery rate are the devising of new geophysical methods, expansion of exploratory activities, extension of surveying to relatively unexplored regions and, above all, application of present methods to the geologic factors responsible for the origin of oil but as yet eluding detection. (2) STRATEGIC MINERALS EXPLORATION: Marked improvement took place in respect to aluminum, copper, and zinc. Geophysical prospecting was done for aluminum. The gravimeter served again in surveying for zinc in the Tri-State district. The Duluth gabbro-slate contact was located more accurately by means of the Hotchkiss Superdip. Chromite was prospected with a magnetometer on the Oregon coast. Resistivity and magnetometer surveys were made in the Ochoco quicksilver area. Magnetometric

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rospecting served for searching nickel-cobalt in the Fredericktown area, Missouri. Magnetometric surveys located tungsten in California. In Canada, many new uses have been found for geophysics, according to H. Lundberg. At Steep Rock Lake in Ontario, a magnetometric survey made on the ice of the lake assisted in outlining the hematite ore body. In Fairbanks, Alaska, magnetometric work on scheelite deposits has been continued. In Mysore, India, a graphite body was discovered under a negative self-potential center. (3) ENGINEERING GEOPHYSICS: The Mississippi River Commission issued two reports on the application of seismic refraction and electrical resistivity to flood control. The first report dealt with depth determinations of Tertiary beds on levee sites of Mississippi; the second report described refraction shooting on proposed dam sites in the Ozark Highlands. At Stanford University, shaking-table tests were conducted to assist in the work on the Kentucky Dam. (4) REGIONAL GEOPHYSICAL INVESTIGATIONS: The Missouri Geological Survey completed gravimeter and magnetometer surveys of the State. The Geological Society of America published the transcontinental gravimetric and magnetic work of G. P. Woolard. Gravimetric and magnetic surveys also were made by Woolard in New Jersey. (5) MANPOWER AND MATERIALS SITUATION: At the end of 1943, the geophysical industry employed an estimated total of 6,000 individuals, including professional, subprofessional, semiskilled, and unskilled men and women. In 1942, the geophysical industry lost about 33 percent of its personnel to the armed forces and 44 percent to other industries and government agencies, so that hired replacements represent turnover of some 77 percent. Priorities on metal stocks are adequate. But construction of new equipment has been behind schedule owing to lack of certain parts. - V. S.

324. Jones, O. T. The Relation of Geophysics to Geology. Abs. of Proc., Geol. Soc. of London, London, sess. 1941-42, Nos. 1381-1388, 1942, pp. 56-57.

The author approaches geophysics primarily as a weapon of geological surveying. He outlines the electrical, magnetic, gravitational, and seismic methods and discusses their application to a number of geological problems. The electrical resistivity methods have been used in exploring for underground waters, buried channels, the depth of overburden on solid rocks, etc. The seismic methods can be employed in determining the depth of relatively unconsolidated sediments overlying the older rocks, the rock floor of sediments in lakes, estuaries, and shallow seas, as well as in mapping bands of hard rock beneath glacial drift, etc. However, such cooperation between geology and geophysics must not be onesided. Reciprocally, geophysics should take advantage of available geological information in interpreting its findings. - V. S.

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7325. Kimio, Uemura. Contributions to Geophysical Prospecting Recently Employed in Japan (Abs.). Internal. Geol. Cong., 17th sess., U.S.S.R., 1937; Abstracts of Papers, Moscow, 1937, p. 186.

A list of geophysical work conducted by the writer since 1922 for the Geological Survey of Japan: (1) Radio seismograph surveying at the Kashiwazaki oil field to detect the structure of the oil-bearing Tertiary formation. (2) Electrical surveying of cupriferous pyrite deposits in crystalline schists, of contact metamorphic copper deposits, and of metasomatic ore deposits; the methods included resistivity, potential drop ratio, self-potential, and induction. (3) Resistivity surveying of oil at a depth of less than 150 m. in the Yabase oil field, Akita district. Some minor geophysical work is likewise mentioned. - V. S.

7326. Kovner, S. S. Progress of Soviet Geophysics During 25 Years. Bull. Acad. Sci. U.R.S.S. (Izvestiia), Série Géographique et Géophysique, Moscow, No. 1, 1943, pp. 3-28.

This review deals with geophysical methods of prospecting used in the U.S.S.R. during the last 25 years - seismic, gravitational, magnetic, electric, geothermal, radioactive, gas-survey, etc. The author draws the conclusion that the main difficulty in interpreting the results of all the methods is the possibility of several different solutions. Thus, the question "Where to drill?" can be answered only by a many-sided examination of all the various results obtained by geophysical exploration. Appended to the review are lists of scientific organizations and journals connected with geophysical work. - W. A.

7327. Lambert, W. D. The Distance Between Two Widely Separated Points on the Surface of the Earth. Jour., Washington Acad. of Sci., Menasha, Wis., vol. 32, No. 5, 1942, pp. 125-130.

The distance between two widely separated points on the surface of the earth is discussed for the case of a slightly flatened ellipsoid of revolution, the connecting line becomes here a geodesic. The two points on the earth are given by their latitudes and longitudes; they are assumed to be intervisible. In such an instance, the lines actually observed by a surveyor are two plane sections of the surface; each plane section has its characteristic property for only one of its points - the point where the plane contains the normal to the surface. The problem thus qualified is treated in terms of spherical trigonometry. Different values are used for the latitude in deriving the formulas. In 5 formulas the parametric, or reduced, latitude is taken; in 5 others, the geographic latitude; and in 2 formulas, a number of successive approximations necessary to obtain the

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uracy of seven-place tables. The results of the formulas are compared means of numerical examples. Numerical results are also given for properties of a minimum geodesic between two points on the earth's ator; they are computed for a flattening of the earth, f = 1/300 a = 000 km. - V. S.

8. Lundberg, Hans. A Plea for Lowering the Brows of the Geophysicists. Min. and Met., New York, vol. 24, No. 444, 1943, p. 560.

In commenting on the report of the Geophysics Education Committee e Geophys. Abs. 115, No. 7195), the author advocates a curriculum sely adapted to exploration geophysics. He agrees with C. A. Heiland t the program recommended by the Committee would prepare geosical scientists rather than practical prospectors. A detailed theoreil knowledge is not necessary, he finds, for handling instruments; yet, andicaps understanding and cooperation between geophysicists and practical miners and geologists. - V. S.

9. Petroleum. Education and Petroleum Industry. London, vol. 6, No. 6, 1943, pp. 81-82.

V. C. Illing gave figures on the relative participation of petroleum nologists and chemists in the Journal of the Institute of Petroleum, don. Although the membership of both groups in the Institute is about al, the articles on chemical subjects in recent years have greatly outbered those on geology, geophysics, and related subjects. - V. S.

0. Turechek, G. F. Gun-Perforating Performances Improved by New Bullet Design. California Oil World and Petroleum Industry, Los Angeles, vol. 36, No. 18, 1943, pp. 9-11; also, Mines Magazine, Denver, Colo., vol. 33, No. 10, 1943, pp. 522-524; also, Tomorrow's Tools - Today, Los Angeles, Calif., vol. 9, No. 3, 1943, pp. 4-7.

The Lane-Wells Co. has developed a new bullet for gun-perforators. s bullet has a conically shaped, ogival head, which provides several ntages: a strong point, a center of gravity moved forward to insure ight flight, a point so proportioned as to give nearly constant disement of the metal being pierced, a bullet whose length-to-weight o is more favorable, and a hole in the casing characterized by a wellded, smooth burr. The new design results in greater penetration better all-around performance. - V. S.

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7331. Uren, L. C. Recent Developments in Formation Logging; Part 2 (Concluded). The Petrol. Eng., Dallas, Tex., vol. 14, No. 6, 1943, pp. 84-88.

Part 1 of this paper was reviewed in Abs. 113, No. 6958. Part 2 deals with temperature logging and inspection of drilling fluid. (1) Tem ature surveys can be made inside of casing. A knowledge of changes i the temperature gradient assists in determining the positions of water oil sands, gas-oil contacts, variations in permeability, casing leaks, e Thermometers used for surveys are of three types: (a) The maximum mercury thermometer, (b) the self-contained, continuously recording lowered into a well, and (c) the continuously recording type in which c element is lowered into the well and another element takes records on the surface. These thermometers are described. (2) Logging by insp tion of drilling fluid is being offered by Baroid Sales, National Lead C It determines depth, thickness, composition, and fluid content of form Most data are automatically recorded as the well is drilled. The intr equipment is mounted in a trailer. It includes a drilling-rate record volumetric meter of circulating fluid, depth-recorder, sclerograph, p cycle counter, gas detector, ultra-violet light detector of oil in the d fluid, electrical detector of salt water, etc. Operation is controlled b continuous tests of the drilling fluid and of the rate of penetration of drill. An illustration shows the logs obtained. - V. S.

7332. Van Tuyl, F. M., et al. Some Significant Developments in 194 Petroleum Geology and Geophysics. Mines Magazine, Denver, vol. 33, No. 10, 1943, pp. 517-520, 548.

This article comprises extracts from the introductory statem the "Review of Petroleum Geology in 1942" by the same authors (s Geophys. Abs. 115, No. 7220). The extracts are prefaced by an ann ment on the inauguration of annual reviews by the Research Commi the American Association of Petroleum Geologists. - V. S.

9. NEW PUBLICATIONS

7333. Carnegie Institution of Washington. Year Book No. 40, July June 30, 1941, Washington, D. C., 1941, 346 pp.

The geophysical work of the Carnegie Institution during the y 1940-41 is reviewed in two sections of the year book. (1) Geophys Laboratory, report by L. H. Adams, director: Experiments were cerned with fusion relations in silicate mixtures (anhydrous), syst

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th water under pressure, properties of solutions under high pressure, bility relations of copper-iron sulfides, sulfidelike compounds, crystal ructure by X-ray analysis, radium content of ocean-bottom sediments, fect of pressure upon the Curie temperature, petrofabric analysis, avity measurements, and volcanology. There were also activities con-cted with the war. A summary of published work accompanies the re-rt. (2) Department of Terrestrial Magnetism, report by J. A. Fleming, rector, and O. H. Gish, assistant director: The Department carried on vestigations of the permanent magnetic field, cosmic relations, magnetic sturbances, upper atmosphere, atmospheric electricity, ionosphere, smic physics and magnetism, as well as instrumental work, field work, servatory work, reduction of the "Carnegie" data, and miscellaneous tivities. Considerable time was devoted to war work. - V. S.

34. Coast and Geodetic Survey, U. S. Department of Commerce. Prog. Rept. on Strong-Motion Earthquake Work, October, November, December, 1943, MSP-47, Washington, D. C., 1943, 8 pp.

The following work is described: (1) San Francisco Office, ques-nnaire program; (2) strong-motion work, with summary of seismograph ta; (3) vibration work; (4) principal earthquakes; (5) Lake Mead project; Shasta Dam and Grand Coulee projects; and (7) Washington office. - V. S.

35. Mayer, A. W. Chemical-Technical Dictionary (German-English-French-Russian). Chemical Publishing Co., Inc., Brooklyn, N. Y., 1942, 872 pp. Price, $8.

The present volume is the first American edition of A. W. Mayer's rman dictionary "Chemisches Fachwörterbuch, Deutsch-Englisch-anzösisch," to which Russian equivalents have been added under the ection of Professors B. N. Menshutkin and M. A. Bloch. - V. S.

36. Newhouse, W. H., Ed. Ore Deposits as Related to Structural Features; Prepared Under the Direction of the Committee on Processes of Ore Deposition of the Division of Geology and Geography of the National Research Council. Princeton University Press, Princeton, N. J., 1942, 280 pp. 248 figs. Price, $6.50.

This volume seeks to correlate the facts of geologic structure and occurrence. Some 60 writers contribute descriptions of the world's st representative ore districts. The descriptions are grouped under following headings: (1) Structural features associated with ore

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deposits of certain types and in large areas; (2) Ore deposits in massive rocks; (3) Ore deposits in layered rocks; and (4) Ore deposits near contact of massive and layered rocks; a chapter, "Structural petrology applied to ore deposits" was written by H. W. Fairbairn. The descriptive material is introduced by a chapter composed of papers by W. H. Newho B. S. Butler, and T. S. Lovering. This introduction gives the general or ganization, geological principles, and conclusions of the total work. Ne house discusses, in particular, fault relations and the occurrence of ore deposits at contacts of dissimilar rocks. - R.T.C., Jour. of Geol., Chic vol. 51, No. 7, 1943, pp. 501-502, condensed by V. S. (Reviewed by W. G Geol. Mag., vol. 80, No. 5, 1943, pp. 196-206).

7337. Oxford University Observatory. The International Seismological Summary: July-December, 1934, Oxford, 1941-42, 329 pp.

This semiannual summary has been prepared and edited by J. S. Hughes and E. F. Bellamy. It consists of two quarterly issues: (1) July September, 1934, pp. 327-514, published in 1941, and (2) October-Dece 1934, pp. 515-656, published in 1942. The same authors also have prep an Index to the International Seismological Summary for 1934. - V. S.

7338. Schuchert, Charles. Stratigraphy of the Eastern and Central United States. John Wiley and Sons, Inc., New York, 1943, 1,013 pp., 4 pls., 123 figs. Price, $15.

This book is the second volume of three in the series "Historica Geology of North America." Together the three volumes are designed document an "Atlas of American Paleography," to be issued as a part the third volume. The present volume is mostly concerned with the ge of separate States. An outline is given of regional physiography and st ture. There follows a highly condensed description of the various for tions and their members, lithology, thickness, and faunal contents. Th text is comprehensively documented with bibliography. The book is al an encyclopedia of stratigraphy. - H. E. Vokes, Science, vol. 98, No. 2 1943, pp. 110-111; condensed by V. S.

7339. Sineriz, J. G. La Interpretacion Geologica de las Mediciones Geofisicas Aplicadas a la Prospeccion (The Geological Interpre of Geophysical Measurements Applied in Prospecting), vol. 2, 6 Memorias del Instituto Geologico y Minero de Espana, Madrid,

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The second volume of this publication (for volume 1 see Geophys. ts. 58, No. 1782) contains descriptions of the following geophysical sur- ys in Spain: (1) Seismic and gravimetric investigations in Navarre and esca for potassium; (2) seismic investigation in Valencia for saline is; (3) seismic investigation in the Straits of Gibraltar with a view to ubmarine tunnel; (4) seismic and gravimetric investigations in Leon for drological information; (5) seismic investigation in El Pardo (Madrid) r geologic information; (6) seismic and electrical investigations in Las zas (Madrid) for hydrological information; and (7) electrical investigation Hiendelaencina of the "Rico" mineral deposit. The descriptions of the vestigations contain a general statement, geographical and geological formation, geophysical work, and a summary. Concrete observations e cited and maps are presented. A geophysical bibliography is appended. V. S.

10. PATENTS

340. Method for the Geochemical Prospection of Hydrocarbon Deposits; Sylvain J. G. Pirson, State College, Pa., assignor to Geochemical Service Corporation, a corporation of Oklahoma. U. S. Patent 2,324,107, issued July 13, 1943.

A method for detecting the presence of hydrocarbon deposits in the rth, comprising drilling a hole into the surface geological strata at a rality of locations over an area to be explored, withdrawing from each le a plurality of samples at different depths, at least one sample being llected at each of the different depths, selecting from the respective les samples having substantially the same degree of acidity, and quanti- tively analyzing the samples so selected for leakage products character- tically associated with the presence of the hydrocarbon deposits sought r, whereby the leakage products determined in each sample may be cor- lated with the sample location in the area being prospected to provide ta from which the location of the hydrocarbon deposits can be determined. Claims allowed, 5.

341. Seismic Surveying: W. T. Born, Tulsa, Okla., assignor to Geophysical Research Corporation, New York, N. Y., a corporation of New Jersey. U. S. Patent 2,324,816, issued July 20, 1943.

Apparatus for seismic surveying comprising means for converting ismic waves into electrical waves, a variable response recorder for d electrical waves, and means actuated by the arrival of seismic ves at said converting means for increasing the recorder response. - ims allowed, 16.

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7342. Gravity Meter; D. H. Clewell, Dallas, Tex., assignor to Socony-Vacuum Oil Co., New York, N. Y., a corporation of New York. U. S. Patent 2,325,005, issued July 20, 1943.

A horizontal, pivoted beam-type gravity meter in which the gravit responsive element has a weight and volume distribution such that chan in gravity moments therein due to changes in elevation will be compensated by changes in buoyancy moments therein due to the same changes in elevation. - Claims allowed, 8.

7343. Means for Obtaining Soil Samples; Herbert Hoover, Jr., Sierra Madre, and H. E. Metcalf, San Francisco, Calif., assignors to Consolidated Engineering Corporation, Pasadena, Calif., a corporation of California. U. S. Patent 2,325,057, issued July 27, 1943.

Apparatus for collecting a soil sample without substantially disturbing the contents thereof, which comprises a body member having an aperture for admitting a substantially rigid preformed soil column, a container holder secured to said body, alined with the axis of said aperture, and adapted to position a container around a free end of said soil column, guides supported by said body member transverse to said axis, cutting means transversely movable in said guides and adapted to sever a portion of said soil from the end of said soil column, said portion bei of such size as to fit into said container readily. - Claims allowed, 7.

7344. Seismographic Prospecting; A. C. Winterhalter, Beaumont, Tex., assignor to Sun Oil Co., Philadelphia, Pa., a corporation of New Jersey. U. S. Patent 2,325,157, issued July 27, 1943.

In combination, a firing circuit for an explosive charge, current supplying means for said circuit, signal-transmitting means comprisin a thermionic vacuum tube having a grid, and means for controlling the transmitting means to transmit a signal upon disruption of the firing ci cuit by explosion of a charge, which simultaneously causes an electrica change in the firing circuit; said last named means comprising an electronic tube of relay type and connections between the last mentioned tu and the firing circuit, whereby it is arranged to discharge upon the disruption of the firing circuit, and connections through which such discha changes the bias on said grid. - Claims allowed, 5.

7345. Method and Apparatus for Seismic Exploration; J. P. Woods, Ho Tex., assignor to Shell Development Co., San Francisco, Calif., a corporation of Delaware. U. S. Patent 2,325,199, issued July 27,

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For use in combination with a seismic recorder and an insulated cle electrically connected to said recorder, a seismic detector com- ising an arcuate magnet member, an armature member adapted to bridge magnet member, resilient means adapted to support one of said mem- rs with regard to the other end to maintain a variable nonmagnetic gap rebetween, one of said members being adapted to be laid in contact th the ground subject to the vibrations thereof, the other member being pported by said resilient means as an inertia element with regard to vibratory member, the coil of said detector being formed of an integral rt of said insulated cable inserted within the magnetic circuit comprising id members. - Claims allowed, 9.

46. Gun Perforator; A. J. Zschokke, Huntington Park, Calif., assignor to Lane-Wells Co., Los Angeles, Calif., a corporation of Delaware. U. S. Patent 2,326,114, issued August 10, 1943.

A gun perforator comprising a gun body having radially directed, ially displaced gun bores, a cartridge chamber having an axially exten- g cartridge-receiving portion intersecting at least one of said gun bores; er cartridge chambers, each having laterally disposed cartridge- ceiving portions for the other of said gun bores, said cartridge-receiving rtions defining, with their respective gun bores, planes normal to the is of the gun body; and ignition passages connecting said cartridge res. - Claims allowed, 8.

47. Seismic Circuit; W. H. Mayne, San Antonio, Tex., assignor to Olive S. Petty, San Antonio, Tex. U. S. Patent 2,326,153, issued August 10, 1943.

The combination, with an electric seismometer, of a blasting circuit, d circuit comprising a source of direct current and the bridge wire of lasting cap connected in series, a recording galvanometer connected to d seismometer, means associating said blasting circuit and said galva- meter so constructed and arranged that signal voltages induced in the sting circuit at the time of "break" of the bridge wire may be so dified that they are transmitted to the galvanometer, said means including thermionic amplifier for the signal voltages, a filter having a high capacity the output of said amplifier, and means to limit the rate of discharge of d capacity through said wire in the event of a short circuit in said plifier whereby it will not be heated to cap-exploding temperature. - ims allowed, 9.

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7348. Apparatus for Determining the Dip in the Earth's Substrata. R. F Davis, Washington, D. C., assignor to Well Surveys, Tulsa, Okla., a corporation of Delaware. U. S. Patent 2,326,640, issued August 10, 1943.

A device for determining the nature of subsurface formations that comprises an electrode adapted to be lowered into an opening in the eart means to measure the depth to which said electrode is lowered, a source of power having one terminal connected to said electrode, a Y resistance to the center of which the other pole of said power source is connected, surface power electrodes connected to the opposite ends of said Y resist ance and adapted to be located in the surface of the earth and in a gener- ally symmetrical arrangement around the mouth of the bore hole, a mea ing electrode positioned in the vicinity of each of said surface power electrodes, a Y inductance connecting said measuring electrodes and ar- ranged so that the arms of said inductances are in substantially the sam position relative to each other as are the surface power electrodes, and means for indicating the direction of the resulting magnetic field around said inductances. - Claims allowed, 4.

7349. Blasting Machine; R. N. Stoddard, East Orange, N. J., assignor to Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., a corporation of Pennsylvania. U. S. Patent 2,326,696, issued August 10, 1943.

The method of firing a plurality of electric blasting caps which comprises generating an alternating current, rectifying the current, ac- cumulating and storing the rectified current of less than firing value, preventing discharge at less than firing value, automatically discharging the stored current upon attaining firing value into a firing line, and supp ing firing current to the plurality of blasting caps simultaneously. - Cla allowed, 4.

7350. Perforating Gun for Oil Well Casings. L. E. Couch, Houston, Tex assignor to Well Tool Development Corporation, a corporation of Texas. U. S. Patent 2,327,340, issued August 24, 1943.

A casing-perforating gun comprising a stock adapted for lowering the casing, a plurality of gun barrels transversely in the stock having firing communication with each other, a projectile mounted in each barr having a firing charge adapted to propel the projectile through the wall the casing, mechanical firing means for the charge, a movable safety member for the firing means, and means actuated by a predetermined

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sliding movement of the stock in the casing to control actuation of the firing means on the down movement of the stock and to move said safety member into and out of safety position as required. - Claims allowed, 68.

7351. Improvement in Well Tools. J. S. McDonald and W. E. A. Ruska, Houston, Tex., assignors to Well Tool Development Corporation, a corporation of Texas. U. S. Patent 2,327,362, issued August 24, 1943.

A perforating gun for well casings comprising a stock having a chamber, an explosive charge therein, a projectile mounted in the stock to be projected by the explosion of the charge, firing means for the charge, safety means for preventing effective operation of the firing means, means for locking said safety means in active position to allow positioning of the gun at a selected depth in the well irrespective of movements of the gun required for said positioning process, said locking means being adapted to be positively unlocked at the will of an operator at the ground surface to allow the charge to be fired. - Claims allowed, 73.

7352. Apparatus for Gas Analysis; E. D. McAlister, Montgomery County, Md., assignor to Standard Oil Development Company, a corporation of Delaware. U. S. Patent 2,327,539, issued August 24, 1943.

Apparatus for gas analysis comprising a source of radiation; an absorption cell for containing a sample of gas, said cell being provided with a plurality of slits covered with windows so placed that radiations entering the cell through one slit pass out through another slit; a plurality of mirrors of selective reflecting material placed so that they will reflect radiations from said source of radiation through the cell, each mirror being constructed of a material which selectively reflects a relatively narrow band of radiations in the infra-red range, and which is selectively absorbed by a gas whose presence is suspected in the sample of gas; and a means for determining the quantity of radiation falling upon it, placed to receive the radiations passing through said cell. - Claims allowed, 4.

7353. Method and Apparatus for Measuring Porosity of Solids. W. L. Horner, Dallas, Tex., assignor to Core Laboratories, Dallas, Tex., a corporation of Delaware. U. S. Patent 2,327,642, issued August 24, 1943.

In the art of measuring, in a porous body, the space filled with gas, the method comprising determining the volume of a sample of the body by immersing it in liquid, forcing the liquid under pressure into the pores

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of said body to compress the gas in said pores and to occupy the space occupied by the gas, and measuring the liquid while under pressure necessary thus to supplant the gas. - Claims allowed, 13.

7354. Gravity Meter. L. L. Antes, Houston, Tex., assignor to Standard Oil Development Company, a corporation of Delaware. U. S. Patent 2,327,692, issued August 24, 1943.

A gravity meter comprising a lever suspended intermediate its ends by a pair of oppositely disposed, horizontally alined torsion springs, a mass secured to one end of said lever arm, a laterally extending bimetallic strip carried by the other end of said lever arm, and a compensating mass slidingly mounted on said bimetallic strip. - Claims allowed, 2.

7355. Gravity Meter. F. G. Boucher, Tulsa, Okla., assignor to Standard Oil Development Company, a corporation of Delaware. U. S. Patent 2,327,697, issued August 24, 1943.

A gravity meter, comprising a moving system, including a horizontally arranged body having a mass extending horizontally from one side thereof, torsional means normally holding said mass and said body in a horizontal position, means for applying a force to said mass through the center of gravity of said body, and means for resisting the effect of said force on said body arranged in the same horizontal plane as the force applying means. - Claims allowed, 3.

7356. Geophone; M. D. McCarty, Dallas, Tex., assignor to Socony-Vacuum Oil Company, New York, a corporation of New York. U. S. Patent 2,328,222, issued August 31, 1943.

In an instrument adapted to detect seismic waves by generating electrical signals corresponding to them of the type that utilizes alternati flux paths that are distinct from the source of direct flux, the improvemen that comprises low reluctance conductors comprising links connecting like poles of permanent magnets for producing direct flux, said links consistin of high-permeability metal filings and a plastic material surrounding said filings and bonding them together into the desired shape.. - Claims allowed

7357. Gun Perforator; G. F. Turechek, Los Angeles, Calif., assignor to Lane-Wells Company, Los Angeles, Calif., a corporation of Delawar U. S. Patent 2,328,308, issued August 31, 1943.

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A gun perforator comprising means defining a cartridge chamber and gun bore; a bullet for said gun bore exposed to the hydrostatic pressure of liquids in which the gun perforator is immersed and adapted to be urged by said hydrostatic pressure backwardly into said cartridge chamber; an explosive cartridge in said cartridge chamber adapted to be compressed by rearward movement of said bullet, said cartridge chamber being larger than said gun bore; and a flange on the inner end of said bullet within said cartridge chamber. - Claims allowed, 7.

7358. Firing Head for Gun Perforators; G. F. Turechek and Lloyd Spencer, Los Angeles, Calif., assignors to Lane-Wells Company, Los Angeles, Calif., a corporation of Delaware. U. S. Patent 2,328,309, issued August 31, 1943.

A firing head for explosively operated well tools comprising a body member; an explosive cartridge supported therein; a firing pin positioned to strike said cartridge; a stem adapted to engage said firing pin, said stem having a laterally flexible portion; and means engageable with said flexible portion to move the end of said stem adjacent said firing pin clear thereof. - Claims allowed, 8.

7359. Well Logging Method; Herbert Hoover, Jr., Sierra Madre, Calif., assignor to Consolidated Engineering Corporation, Pasadena, Calif., a corporation of California. U. S. Patent 2,328,555, issued September 7, 1943.

In a well-drilling operation, the improvement that comprises locating gas-oil contact in a petroleum-bearing zone by determining the increments of light hydrocarbons and the increments of heavy hydrocarbons in a series of portions of the mud column circulated past the bottom of the well, said portions being substantially undiluted by infiltration of fluids from said zone but containing cuttings corresponding to successive bottom points in said zone at known depths in the well, some of said points being above and some below the gas-oil contact, and determining the depth in said zone at which the increment of heavy hydrocarbons increases rapidly as compared with the increment of the light hydrocarbons. - Claims allowed, 2.

7360. Fluid Well Perforator; P. T. Bynum, Beeville, Tex. U. S. Patent 2,328,782, issued September 7, 1943.

A fluid well-perforator including a cylinder, a cylinder head closing the cylinder at its upper end, a stem slidable through the cylinder head,

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a plunder head on the stem within the cylinder, a perforator knife in the cylinder, and fluid-operated means between the perforator knife and the plunger head and operable upon downward movement of the stem for projecting the perforator knife to perforate a casing wall, said fluid-operated means including an enclosed operating cylinder fixed to the first-mentioned cylinder and a plunger in the operating cylinder, said plunger being connected with the stem. - Claims allowed, 24.

7361. Automatic Volume Control; S. A. Scherbatskoy, Tulsa, Okla., assignor to Engineering Laboratories, Inc., Tulsa, Okla., a corporation of Oklahoma. U. S. Patent 2,329,558, issued September 14, 1943.

In an automatic volume-control system (for seismograph amplifiers a nonlinear resistance in series with a condenser connected across the signal channel, another nonlinear resistance in series with another condenser across the said signal channel in opposition to said first resistance and condenser, and means for applying a control voltage across the nonlinear resistances according to the volume of the signal. - Claims allowed, 1.

7362. Device for Regulating the Sensitivity of Signal Receiving Apparatus; Robert Wellenstein, Werner Holle, and Martin Schumacher, Bremen, Germany; vested in the Alien Property Custodian. U. S. Patent 2,329,570, issued September 14, 1943.

In a signal-receiving apparatus, means amplifying impulse signals and disturbance waves, grid-control means for said amplifier, means providing a negative biasing voltage varying in amplitude with the magnitude of the amplified signal impulses and disturbance waves, means applying said biasing voltage to said grid-control means, and means delaying the transmission of the grid-control means of each biasing impulse produced by signal impulse so that each biasing impulse does not affect the amplification of said amplifier during the reception of the corresponding signal impulse, the feature for accomplishing this result being the interdependency of the biasing circuits and the inclusion therein of devices having opposed elements arranged to increase or decrease the grid bias of the amplifier in response to variations in the magnitude of the disturbance waves and the time period of the signal impulses. - Claims allowed,

7363. Geophysical Exploration System; Herbert Hoover, Jr., Sierra Madre, C. G. Morgan, Pasadena, and N. J. Christie, Whittier, Calif.,

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assignors to Consolidated Engineering Corporation, Los Angeles, Calif., a corporation of California. U. S. Patent 2,329,721, issued September 21, 1943.

In seismic prospecting involving generation of a first set of seismic ves in the earth at a shot point, the reception of this set of waves at a ries of reception points in the earth spaced horizontally from each other d from the shot point, the generation of a second and later set of waves a shot point in the earth, and the reception of this second set of waves a series of reception points in the earth spaced from each other and m the shot point at which said waves are generated, the arrangement shot point and reception points for the first set of waves being at least part different from the arrangement of the shot point and reception nts for the second set of waves, the improvement that comprises eiving both sets of waves at reception points spaced from both shot nts, receiving in the first set a first plurality of waves after said ves have been reflected from one portion of a reflecting horizon in earth, receiving in the second set a second plurality of waves after se have been reflected from a different portion of the reflecting horizon, l receiving in the first and second sets at least one reference wave lected from substantially the same point on the reflecting horizon, d reference waves having travel paths from the generation point to eption point of substantially the same length. - Claims allowed, 9.

4. Method of Determining Suitable Areas for Oil Exploration; J. G. Campbell, Houston, Tex., assignor to R. H. Fash, Fort Worth, Tex. U. S. Patent 2,329,824, issued September 21, 1943.

The method in the exploration for oil to localize the areas to be re intensively explored, which consists in analyzing measured samples water taken from streams, springs, or wells in said areas by subjecting h measured sample to ultraviolet light, determining the content of the contained in the body of the liquid sample by measuring the intensity he resulting fluorescent effect and then selecting the favorable areas the basis of the data thus obtained. - Claims allowed, 3.

5. Geochemical Prospecting; M. A. Arthur, Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware. U. S. Patent 2,330,021 issued September 21, 1943.

A method for prospecting for subterranean petroliferous deposits, ch comprises collecting samples of soil at spaced points in an area be explored, drying each sample, crushing and screening it so as to

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produce particles having a particle size between about 147 and 417 microns, and analyzing such particles for a selected inorganic constituent by emission spectrum analysis, whereby the analyses may be correlated with sample locations to produce a picture from which the presence of subsurface deposits of oil may be prognosticated. - Claims allowed, 3.

7366. Geochemical Prospecting; L. W. Blau, Houston, Tex., assignor t Standard Oil Development Co., a corporation of Delaware. U. S. Patent 2,330,026, issued September 21, 1943.

A method for prospecting for subterranean petroliferous deposit which comprises collecting soil samples at spaced points over an area to be explored at a depth at which aerobic bacteria can exist, forming an extract of each sample containing a product of the action of any hyd carbon-consuming bacteria that may have been in the sample on hydrocarbons, and determining the absorption power of each extract for lig including a band of wave lengths ranging from about 4,600 to 6,000 Ang stroms, whereby the results of such determinations may be correlated with sample locations to produce a picture from which the presence o subsurface deposits of oil may be prognosticated. - Claims allowed, 6

7367. Apparatus for Seismic Prospecting; Herbert Hoover, Jr., Sierr Madre, and Merrill Swan, Pasadena, Calif., assignors to Consol dated Engineering Corporation, Los Angeles, Calif., a corporat of California. U. S. Patent, 2,330,216, issued September 28, 19

In seismic prospecting apparatus for reproducing and recordin train of reflected seismic waves, in which there is a gradual shift in spectrum of the reflected waves from high frequencies to low frequer during the wave reception, having a receptor for converting the seis wave train into a corresponding electrical wave train having the sam frequency components, the combination of an electrical wave amplifi having an input and output and capable of passing a band of said elect waves therethrough, a filter intermediate the input and output of the amplifier, a variable inductance serving as a filter element, said ind ance being in the form of a reactor wound on a magnetic core, a cont winding also wound on the core, a current-supply device connected i series with the control winding, and current-control means connecte with the current supply device to vary the current supplied to the co winding as such a function of time as to shift the maximum sensitivi of the amplifier to lower and lower frequencies as a function of time during the amplification of the electrical waves. - Claims allowed,

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68. Geochemical Prospecting; Leo Horvitz, Houston, Tex., assignor to E. E. Rosaire, Houston, Tex. U. S. Patent 2,330,716, issued September 28, 1943.

In geochemical prospecting for subsurface carboniferous deposits, e steps that comprise collecting samples of soil in a region to be ex- red, subjecting each sample to a treatment suitable for altering the sical structure of water-insoluble carbonates contained therein in h a way as to disengage from said carbonates any constituents as- iated therewith, recovering from the soil sample a constituent signi- ant of the existence of a subsurface carboniferous deposit, other than carbonate, or a product of its dissociation, and determining the quantity said constituent. - Claims allowed, 10.

69. Geochemical Prospecting; Leo Horvitz, Houston, Tex., assignor to E. E. Rosaire, Houston, Tex. U. S. Patent 2,330,717, issued September 28, 1943.

A method for recovering a sample of gas containing hydrocarbons r analysis from a soil sample containing firmly adhering, normally seous hydrocarbons, which comprises confining the soil sample in a sed system, subjecting the sample to a degassing treatment suitable r the removal therefrom only of interstitial gas, discarding such gas m the system, then subjecting the soil sample to an additional degassing atment to remove therefrom a second quantity of gas, and collecting s latter quantity of gas for analysis for the hydrocarbon content thereof. Claims allowed, 7.

70. Geochemical Prospecting; M. S. Taggart, Jr., Houston, Tex., assignor to Standard Oil Development Co., a corporation of Delaware. U. S. Patent 2,330,758, issued September 28, 1943.

A method for treating a soil sample for the recovery therefrom of as to be analyzed for the presence therein of constituents significant subterranean petroliferous deposits, which comprises intimately xing with the soil a substance that, upon treatment with strong mineral d, evolves a gas other than a hydrocarbon gas, treating the mixture h a strong mineral acid, and collecting the evolved gas for analysis. - ims allowed, 4.

71. Method of Geophysical Exploration; H. T. F. Lundberg, Toronto, Ontario, and N. B. Keevil, Swansea, Ontario, Canada, assignors

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to Lundberg Exploration S. A., Panama City, Panama, a corporati of Panama. U. S. Patent 2,330,829, issued October 5, 1943.

A method of geophysical exploration including taking samples fro the earth at different points in a field being investigated, measuring the radio-activity of emanations held by said samples to determine the rati between the concentrations thereof at the different points from which samples were taken, and calculating, by comparison of said ratios, the presence and location of a sought-for deposit. - Claims allowed, 23.

7372. Method of Seismic Reflection Surveying; O. S. Petty, San Antonio, Tex. U. S. Patent 2,331,080, issued October 5, 1943.

A method of reflection seismograph surveying that includes the steps of detonating an explosive charge at a first point adjacent to the surface to propagate seismic waves in the earth, detecting the reflectio of said waves from subsurface formations at a plurality of spaced secon points adjacent to the surface and arranged to form a complete circle, o which said first point is substantially at the center, the spacing between adjacent second points being less than the radius of said circle, and the radius being less than the critical distance corresponding to the critical reflecting angle, and amplifying and recording the wave reflections so detected. - Claims allowed, 5.

7373. Means for Logging Wells; Floyd Willis, Jr., Dallas, Tex. U. S. Patent 2,331,152, issued October 5, 1943.

An apparatus for logging wells comprising a vibration pick-up un assembly mounted on the Kelly joint of a well rigging and arranged to rotate with the drill stem thereof, said unit being provided with means for transmitting amplitude and traversing electrical impulses and inclu a sweep device with a light ring and a photoelectric tube, the light ring rotating before the tube to produce an electric current change in the tu proportional to the rotation of the drill bit; the apparatus including an oscillograph for receiving and exhibiting said impulses. - Claims allowed, 1.

7374. Seismic Prospecting System; H. W. Washburn, Pasadena, Calif., assignor to Consolidated Engineering Corporation, Pasadena, Calif., a corporation of California. U. S. Patent 2,331,363, issue October 12, 1943.

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An apparatus for measuring the relative times required for waves simultaneously generated at a single source to travel to spaced points; wave detectors located at said points adapted to convert received waves into corresponding electrical waves; a group of corresponding electrical wave reproducing elements located in fixed relationship to each other and said points; transmission lines of different lengths connecting the detectors to the respective reproducing elements, said lengths corresponding to the respective distances of the corresponding detectors to the corresponding reproducing elements; equalizing impedances of different values connected in lines of different lengths and so proportioned with respect to the lengths of the respective lines as to assure that waves are applied to the reproducing elements in the same time-phase relationship that they bear at the spaced points; and common time-measuring means connected to said reproducing elements for indicating the relative times of arrival of waves at said points. - Claims allowed, 5.

7375. Seismic Circuit; J. O. Parr, Jr., San Antonio, Tex., assignor to O. S. Petty, San Antonio, Tex. U. S. Patent 2,331,623, issued October 12, 1943.

Means for increasing the sharpness of a time-break signal resulting from the breaking of the blasting-cap bridge wire comprising a resonant circuit adapted to be set in oscillation at high frequency by the voltage change resulting from said breaking; a vacuum tube having a control element biased to normally provide a current flow in the output of the tube; means coupling said element to said circuit to superimpose the oscillation voltages on the said bias; a transformer having its primary winding traversed by said output current; and a recording galvanometer connected to the secondary of said transformer. - Claims allowed, 11.

7376. Method of an Apparatus for Seismic Surveying; J. O. Parr, Jr., San Antonio, Tex., assignor to O. S. Petty, San Antonio, Tex. U. S. Patent 2,331,624, issued October 12, 1943.

The combination with an inertia-type, earth displacement-actuated transducer of the electromechanical style, of a seismometer actuated solely by compression, which results in changing the length of one horizontal axis thereof, and means to combine the effects of said devices for the purposes describes. - Claims allowed, 14.

7377. Geophysical Instrument; G. V. A. Gustafsson, Stockholm, and J. D. Malmquist, Boliden, Sweden. U. S. Patent 2,331,904, issued October 19, 1943.

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In an instrument for geophysical prospecting, a mass; means for yieldingly counterbalancing the weight of said mass to permit movement thereof in response to variations in the value of gravity; means for applying equal and oppositely directed forces to said mass, said forces being applied perpendicularly to the direction of movement of said mass when the mass occupies its zero position, but exerting a component of force in the direction of movement of said mass upon departure of said mass from its zero position. - Claims allowed, 5.

7378. Method and Device for Referring a Level in a Borehole to the Bottom of Said Borehole; Marcel Schlumberger, Paris, France, assignor, by mesne assignments, to Schlumberger Well Surveying Corporation, Houston, Tex., a corporation of Delaware. U. S. Patent 2,332,348, issued October 19, 1943.

In a method of measuring distances in a borehole from a reference point located a considerable distance from the top thereof, said borehole having a potential distribution therein in the vicinity of said reference point, which varies abruptly therealong, the steps of disposing an electrode on an elastic cable at said reference point in the borehole, pulling up said cable at the surface of the earth, thereby producing an initial elongation thereof without moving the electrode, and beginning the measurements at the instant the potential difference produced between the electrode and a ground point by said potential distribution begins to change, whereby errors caused by elastic elongation of the cable may be minimized. - Claims allowed, 10.

7379. Differential Radioactivity Logging; Daniel Silverman, Tulsa, Okla., assignor to Stanolind Oil & Gas Co., Tulsa, Okla., a corporation of Delaware. U. S. Patent 2,332,873, issued October 26, 1943.

Apparatus for gamma-ray well logging including a water-tight case adapted to be lowered into said well, two ionization chambers mounted within said case a fixed distance apart, said ionization chambers being shielded from penetrating radiation except that coming from a predetermined narrow region, means mounted within said case for alternately shielding said two ionization chambers from penetrating radiation from said narrow region, and means for amplifying and recording the relative response from said two ionization chambers to said radiation. - Claims allowed, 2.

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